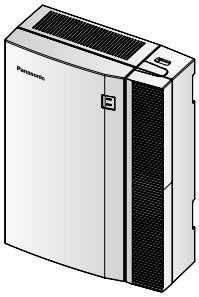
Panasonic



Hybrid IP-PBX
Installation Manual

Model no. KX-TDA30

Thank you for purchasing the Panasonic Hybrid IP-PBX, KX-TDA30.
Please read this manual carefully before using this product and save this manual for future use.

SD Logo is
a trademark.

System Components

System Components Table

	Model	Description
Main Unit	KX-TDA30	Main Unit
Trunk Cards	KX-TDA3180	4-Port Analogue Trunk Card (LCOT4)
	KX-TDA3193	4-Port Caller ID Card (CID4)
	KX-TDA3280	2-Port BRI Card (BRI2)
	KX-TDA3480	4-Channel VoIP Gateway Card (IP-GW4)
Extension Cards	KX-TDA3171	4-Port Digital Extension Card (DLC4)
	KX-TDA3172	8-Port Digital Extension Card (DLC8)
	KX-TDA3173	4-Port Single Line Telephone Extension Card (SLC4)
	KX-TDA3174	8-Port Single Line Telephone Extension Card (SLC8)
Other Cards	KX-TDA3161	4-Port Doorphone Card (DPH4)
	KX-TDA3162	2-Port Doorphone Card (DPH2)
	KX-TDA3166	8-Channel Echo Canceller Card (ECHO8)
	KX-TDA3168	Extension Caller ID Card (EXT-CID)
	KX-TDA3191	2-Channel Message Card (MSG2)
	KX-TDA3196	Remote Card (RMT)
Cell Stations (CSs)	KX-TDA0141CE	2-Channel Cell Station Unit for DECT Portable Station
	KX-TDA0141	2-Channel Cell Station Unit for 2.4 GHz Portable Station
Proprietary Equipment	KX-A236	Additional AC Adaptor and AC Cord
	KX-A228	S/M-type Back-up Battery Cable
	KX-T30865	Doorphone

Available Proprietary Telephones

The Hybrid IP-PBX supports all of the Panasonic KX-T7000 and KX-TD7000 series:

- Digital/Analogue proprietary telephones (e.g., KX-T7625, KX-T7630, KX-T7633, KX-T7636)
- Portable stations (e.g., KX-TD7590, KX-TD7690)
- DSS consoles (e.g., KX-T7640)
- Single line telephones (e.g., KX-T7710)

Note

The Hybrid IP-PBX does not support the following telephones:

- KX-T30800 series Proprietary Telephones and DSS consoles
- KX-T61600 series Proprietary Telephones and DSS consoles

- KX-T123200 series Proprietary Telephones and DSS consoles
- KX-T7500 Digital Portable Station
- KX-TD7500 DECT Portable Station

For the equipment (e.g., Add-on Key Module, USB Module, Headset[*1]) that can be connected to a particular telephone, refer to the telephone's manual.

For other equipment that can be connected to the Hybrid IP-PBX, refer to "1.2.2 System Connection Diagram".

Abbreviations in this manual

Proprietary telephone: PT

Digital proprietary telephone: DPT

Analogue proprietary telephone: APT

Portable station: PS

Single line telephone: SLT

Notice

- There are some optional service cards and features that are not available for certain countries/areas. Consult your certified Panasonic dealer for detailed instructions.
- The power supply capacity of the Hybrid IP-PBX may differ from the values described in this manual depending on the model number. Please consult your dealer for detailed information.

[*1] The KX-T7090 headset can be connected to the KX-T7000, KX-T7200, KX-T7300, KX-T7400, and KX-T7500 (except for KX-T7560/KX-T7565) series telephones.

Important Safety Instructions

SAFETY REQUIREMENTS

When using your telephone equipment, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Read and understand all instructions.
2. Follow all warnings and instructions marked on the product.
3. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
4. Do not use this product near water, for example, near a bathtub, wash bowl, kitchen sink, or laundry tub, in a wet basement, or near a swimming pool.
5. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
6. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or other heat source. This product should not be placed in a built-in installation unless proper ventilation is provided.
7. This product should be operated only from the type of power source indicated on the product label. If you are not sure of the type of power supply to your home, consult your dealer or local power company.
8. This product is equipped with a 3-wire earthing type plug, a plug having a third (earthing) pin. This plug will only fit into an earthing type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the safety purpose of the earthing type plug.
9. Do not allow anything to rest on the power cord. Do not locate this product where the cord will be abused by people walking on it.
10. Do not overload wall outlets and extension cords as this can result in the risk of fire or electric shock.
11. Never push objects of any kind into this product through cabinet slots as they may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
12. To reduce the risk of electric shock, do not disassemble this product, but take it to a qualified person when some service or repair work is required. Opening or removing covers may expose you to dangerous voltages or other risks. Incorrect reassembly can cause electric shock when the appliance is subsequently used.
13. Unplug this product from the wall outlet and refer servicing to qualified service personnel under the following conditions:
    - **a)** When the power supply cord or plug is damaged or frayed.
    - **b)** If liquid has been spilled into the product.
    - **c)** If the product has been exposed to rain or water.
    - **d)** If the product does not operate normally by following the operating instructions. Adjust only those controls that are covered by the operating instructions because improper adjustment of other controls may result in damage and will often require extensive work by a qualified technician to restore the product to normal operation.
    - **e)** If the product has been dropped or the cabinet has been damaged.

f) If the product exhibits a distinct change in performance.

14. Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electric shock from lightning.

15. Do not use the telephone to report a gas leak in the vicinity of the leak.

SAVE THESE INSTRUCTIONS

Precaution

- Keep the unit away from heating appliances and electrical noise generating devices such as fluorescent lamps, motors and televisions. These noise sources can interfere with the performance of the Hybrid IP-PBX.
- This unit should be kept free of dust, moisture, high temperature (more than 40 °C) and vibration, and should not be exposed to direct sunlight.
- Never attempt to insert wires, pins, etc. into the vents or other holes of this unit.
- If there is any trouble, disconnect the unit from the telephone line. Plug an SLT into the telephone line. If the telephone operates properly, do not reconnect the unit to the line until the trouble has been repaired by an authorised Panasonic Factory Service Centre. If the telephone does not operate properly, chances are that the trouble is in the telephone system, and not in the unit.
- Do not use benzene, thinner, or the like, or any abrasive powder to clean the cabinet. Wipe it with a soft cloth.

For users in Germany only

- When the unit is working, the noise is less than 70 dB (A) according to DIN 45635 Part 19.

For users in New Zealand only

- This equipment shall not be set to make automatic calls to the Telecom '111' Emergency Service.
- The grant of a Telepermit for any item of terminal equipment indicates only that Telecom has accepted that the item complies with minimum conditions for connection to its network. It indicates no endorsement of the product by Telecom, nor does it provide any sort of warranty. Above all, it provides no assurance that any item will work correctly in all respects with another item of Telepermitted equipment of a different make or model, nor does it imply that any product is compatible with all of Telecom's network services.
- This equipment is not capable, under all operating conditions, of correct operation at the higher speeds for which it is designed. Telecom will accept no responsibility should difficulties arise in such circumstances.
- Some parameters required for compliance with Telecom's Telepermit requirements are dependent on the equipment (PBX) associated with this modem. In order to operate within the limits for compliance with Telecom's Specifications, the associated PBX equipment shall be sent to ensure that modem calls are answered between 3 and 30 seconds of receipt of ringing.
- IMPORTANT NOTICE
  Under power failure conditions, the wireless telephones may not operate. Please ensure that separate telephone, not dependent on local power, is available for emergency use in emergencies.

For users in Australia only

- No External TRC Terminal is provided due to an Internal Link between PE and TRC.

WARNING

- **THIS UNIT MAY ONLY BE INSTALLED AND SERVICED BY QUALIFIED SERVICE PERSONNEL.**

- **WHEN A FAILURE OCCURS WHICH EXPOSES ANY INTERNAL PARTS, DISCONNECT THE POWER SUPPLY CORD IMMEDIATELY AND RETURN THIS UNIT TO YOUR DEALER.**
- **DISCONNECT THE TELECOM CONNECTION BEFORE DISCONNECTING THE POWER CONNECTION PRIOR TO RELOCATING THE EQUIPMENT, AND RECONNECT THE POWER FIRST.**
- **THIS UNIT IS EQUIPPED WITH AN EARTHING CONTACT PLUG. FOR SAFETY REASONS THIS PLUG MUST ONLY BE CONNECTED TO AN EARTHING CONTACT SOCKET WHICH HAS BEEN INSTALLED ACCORDING TO REGULATIONS.**
- **TO PREVENT THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE.**
- **THE POWER SUPPLY CORD IS USED AS THE MAIN DISCONNECT DEVICE. ENSURE THAT THE SOCKET-OUTLET IS LOCATED/ INSTALLED NEAR THE EQUIPMENT AND IS EASILY ACCESSIBLE.**

CAUTION

DANGER OF EXPLOSION EXISTS IF BATTERY IS INCORRECTLY REPLACED. REPLACE ONLY WITH THE SAME OR EQUIVALENT TYPE RECOMMENDED BY THE MANUFACTURER. DISPOSE OF USED BATTERIES ACCORDING TO THE MANUFACTURER'S INSTRUCTIONS.

The serial number of this product may be found on the label affixed to the side of the unit. You should note the model number and the serial number of this unit in the space provided and retain this book as a permanent record of your purchase to aid in identification in the event of theft.

MODEL No.: _____

SERIAL No.: _____

For your future reference

DATE OF PURCHACE _____

NAME OF DEALER _____

DEALER'S ADDRESS _____

_____

_____

_____

DEALER'S TEL. NO. _____

CE

The KX-TDA30E, the KX-TDA30NE, the KX-TDA30GR, and the KX-TDA30CE are designed to interwork with the:

- Analogue Public Switched Telephone Network (PSTN) of a European country
- Pan-European Integrated Services Digital Network (ISDN) using ISDN basic rate access

We, Panasonic Communications Co., Ltd./Panasonic Communications Company (U.K.) Ltd., declare that this equipment is in compliance with the essential requirements and other relevant provisions of Directive 1999/5/EC.
If you want to get a copy of the original Declaration of Conformity of our products which relates to the R&TTE, please contact to our web address:

http://doc.panasonic-tc.de

Introduction

This Installation Manual is designed to serve as an overall technical reference for the Panasonic Hybrid IP-PBX, KX-TDA30. It provides instructions for installing the hardware, and programming the Hybrid IP-PBX using the KX-TDA Maintenance Console.

The Structure of this Manual

This manual contains the following sections:

Section 1 System Outline

Provides general information on the Hybrid IP-PBX, including the system capacity and specifications.

Section 2 Installation

Describes the procedures to install the Hybrid IP-PBX. Detailed instructions for planning the installation site, installing the shelves and optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and peripheral equipment installation is included.

Section 3 Guide for the KX-TDA Maintenance Console

Explains the installation procedure, structure, and basic information of the KX-TDA Maintenance Console.

Section 4 Troubleshooting

Provides information on the Hybrid IP-PBX and telephone troubleshooting.

About the Other Manuals

Along with this Installation Manual, the following manuals are available:

Feature Guide

Describes all basic, optional and programmable feature of the Hybrid IP-PBX, and step-by-step instruction for performing system programming using a proprietary telephone or a personal computer (PC).

User Manual

Provides operating instructions for end users using PTs, SLTs, PSs, or DSS Consoles.

Trademarks

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- Intel and Pentium are trademarks or registered trademarks of Intel Corporation or its subsidiaries in the United States and other countries.
- All other trademarks identified herein are the property of their respective owners.
- Screen shots reprinted with permission from Microsoft Corporation.

Precautions for Users in the United Kingdom

FOR YOUR SAFETY, PLEASE READ THE FOLLOWING TEXT CAREFULLY.

This appliance is supplied with a moulded three pin mains plug for your safety and convenience. A 5 amp fuse is fitted in this plug. Should the fuse need to be replaced, please ensure that the replacement fuse has a rating of 5 amps and that it is approved by ASTA or BSI to BS1362.

Check for the ASTA mark or the BSI mark on the body of the fuse.

If the plug contains a removable fuse cover, you must ensure that it is refitted when the fuse is replaced. If you lose the fuse cover, the plug must not be used until a replacement cover is obtained. A replacement fuse cover can be purchased from your local Panasonic Dealer.

IF THE FITTED MOULDED PLUG IS UNSUITABLE FOR THE SOCKET OUTLET IN YOUR PREMISES, THEN THE FUSE SHOULD BE REMOVED AND THE PLUG CUT OFF AND DISPOSED OF SAFELY. THERE IS A DANGER OF SEVERE ELECTRICAL SHOCK IF THE CUT OFF PLUG IS INSERTED INTO ANY 13 AMP SOCKET.

If a new plug is to be fitted, please observe the wiring code as shown below. If in any doubt, please consult a qualified electrician.

WARNING

THIS APPLIANCE MUST BE EARTHED.

IMPORTANT: The wires in this mains leads are coloured in accordance with the following code:

Green-and-yellow: Earth

Blue: Neutral

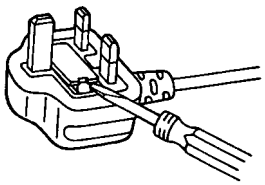
Brown: Live

As the colours of the wires in the mains lead of this apparatus may not correspond with the coloured markings identifying the terminals in your plug, proceed as follows.
The wire that is coloured GREEN-AND-YELLOW must be connected to the terminal in the plug that is marked with the letter E or by the safety earth symbol ⏚ or coloured GREEN or GREEN-AND-YELLOW.

The wire that is coloured BLUE must be connected to the terminal that is marked with the letter N or coloured BLACK.

The wire that is coloured BROWN must be connected to the terminal that is marked with the letter L or coloured RED.

How to replace the fuse: Open the fuse compartment with a screwdriver and replace the fuse and fuse cover.



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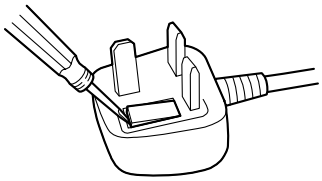

This equipment should be used on PSTN lines requiring 2-wire Loop calling unguarded clearing with Loop Disconnect or DTMF address signalling.
The equipment must be connected to direct extension lines and a payphone should not be connected as an extension.

999 and 112 can be dialled on the apparatus after accessing the Exchange line for the purpose of making outgoing calls to the BT emergency (999) and (112) service.

During dialling, this apparatus may tinkle the bells of other telephones using the same line. This is not a fault and we advise you not to call Fault Repair Service.

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Section 1

System Outline

This section provides general information on the Hybrid IP-PBX, including the system capacity and specifications.

1.1 System Highlights

1.1.1 System Highlights

Networking Features

This Hybrid IP-PBX supports the following networking features:

Virtual Private Network (VPN)

VPN is a service provided by the telephone company. It uses an existing line as if it were a private line.

Voice over Internet Protocol (VoIP) Network

The PBX can connect to another PBX via an IP-type private network. In this case, voice signals are converted into IP packets and sent through this network.

Built-in Small Call Centre Features

An incoming call distribution group can be used as a small call centre with the following features:

Queuing Feature

When a preprogrammed number of extensions in an incoming call distribution group are busy, additional incoming calls can wait in a queue. While calls are waiting in the queue, the calls are handled by the Queuing Time Table, which can be assigned for each time mode (day/lunch/break/night).

Log-in/Log-out

Incoming call distribution group members can join (**Log-in**) or leave (**Log-out**) the groups manually. While logged-in, a member extension can have a preprogrammed time period automatically for refusing calls after completing the last call (**Wrap-up**).

VIP Call

It is possible to assign a priority to incoming call distribution groups. If an extension belongs to multiple groups and the extension becomes idle, queuing calls in the groups will be distributed to the extension in priority order.

Computer Telephony Integration (CTI) Features

Connecting a personal computer (PC) to this Hybrid IP-PBX (via a DPT, or via a Server PC on a LAN) enables extension users to make use of advanced features by using the stored data in the PC or in the Server PC.

Voice Mail Features

This Hybrid IP-PBX supports Voice Processing Systems (VPS) with DTMF Integration as well as DPT (Digital) Integration.

Portable Station (PS) Features

PSs (e.g., KX-TD7690) can be connected to this Hybrid IP-PBX. It is possible to use the Hybrid IP-PBX features using the PS like a PT. A PS can also be used in parallel with a wired telephone (**Wireless XDP Parallel Mode**). In this case, the wired telephone is the main telephone and the PS is the sub telephone.

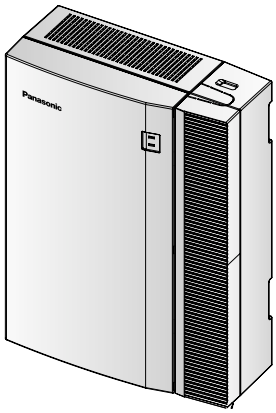
PC Phone/PC Console Features

This Hybrid IP-PBX supports the connection of a PC Phone and a PC Console. The Hybrid IP-PBX provides advanced features by using a PC Phone and a PC Console.

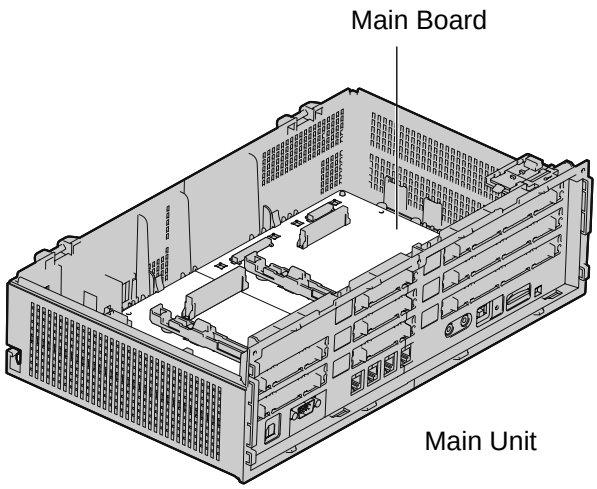
1.2 Basic System Construction

1.2.1 Main Unit

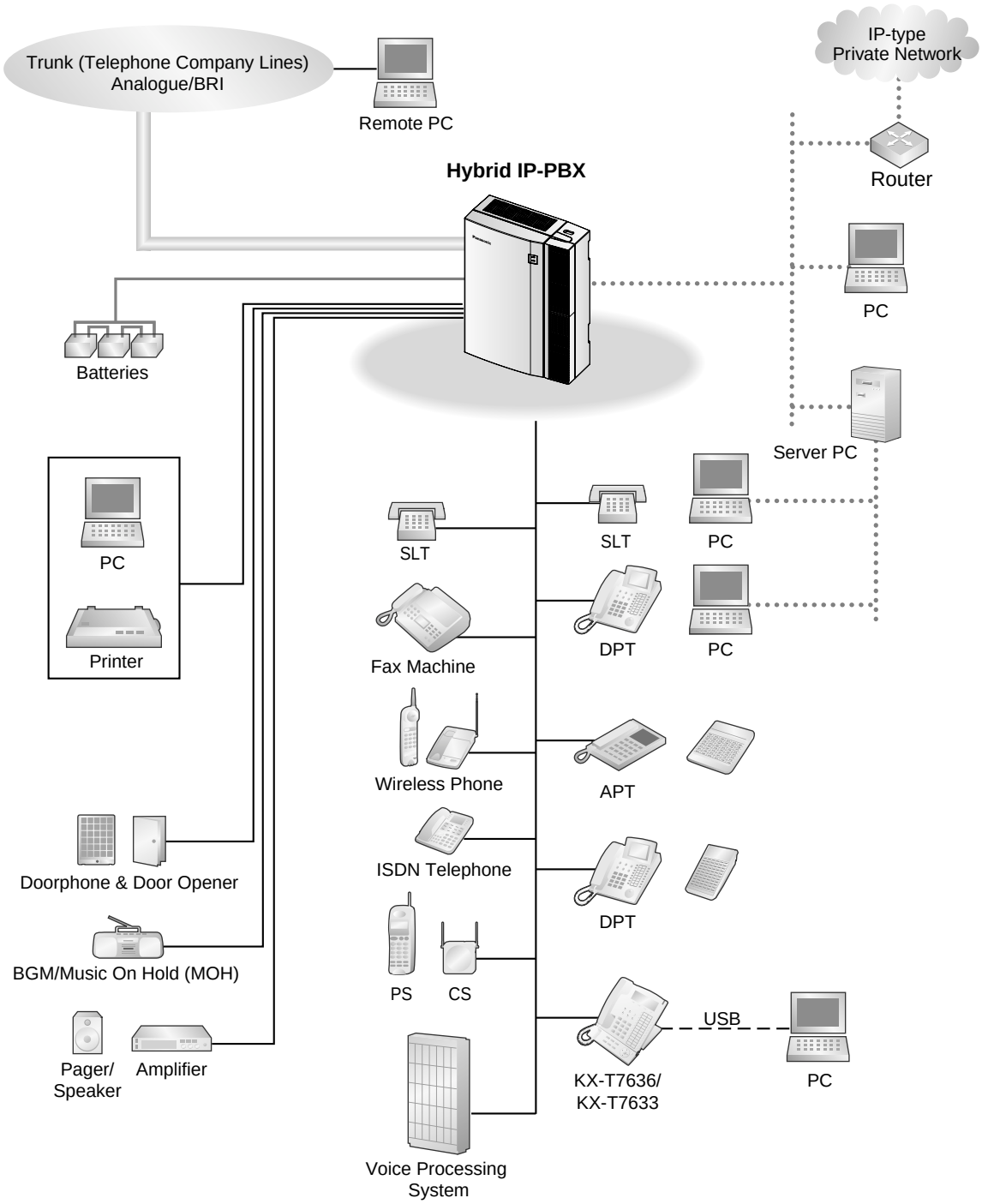
The main unit is equipped with 4 hybrid extension ports. For system expansion, optional service cards can be installed, and an additional AC adaptor can also be connected.

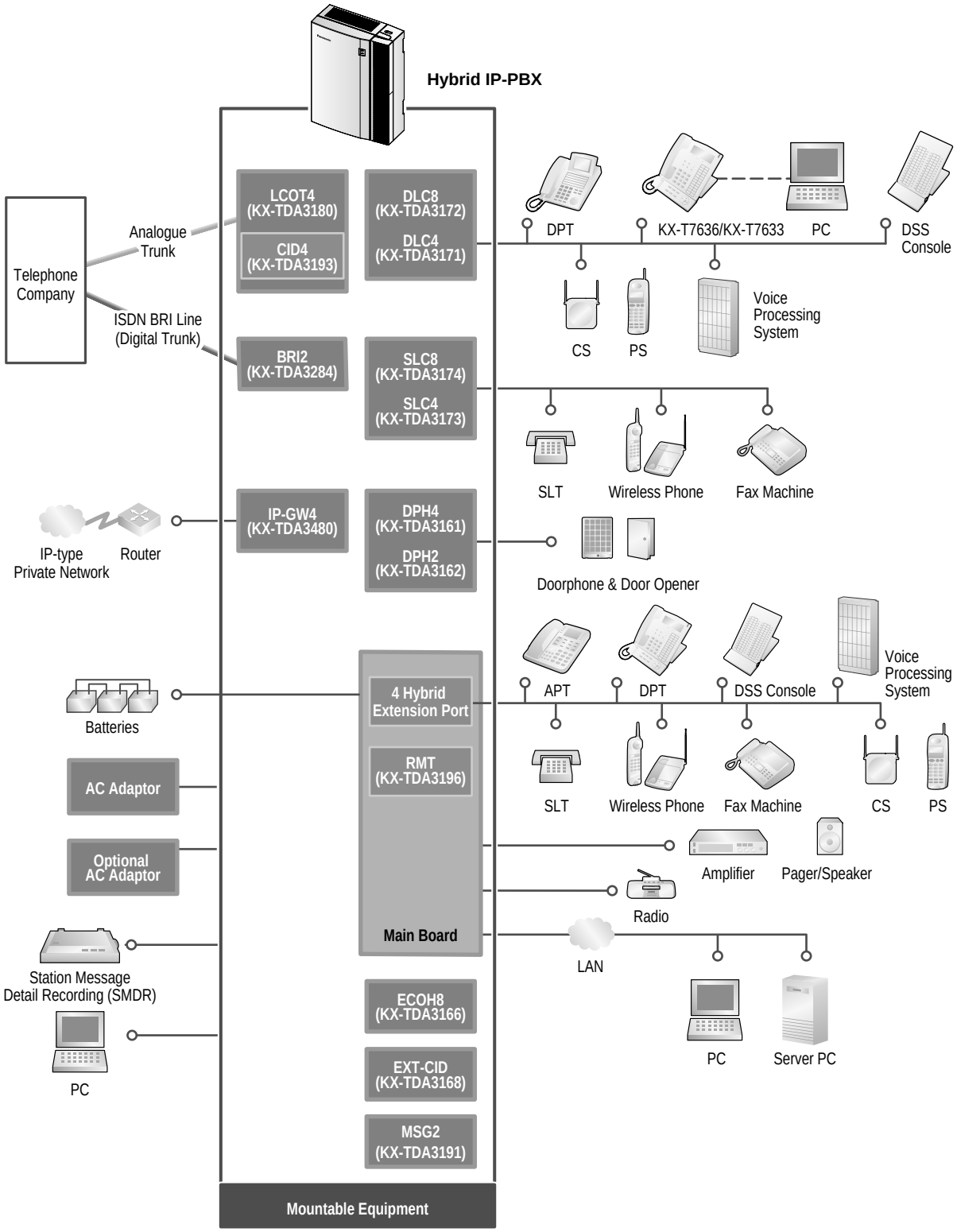


Construction of Main Unit



1.2.2 System Connection Diagram




Hybrid IP-PBX
Telephone Company
Analogue Trunk
ISDN BRI Line (Digital Trunk)
LCOT4 (KX-TDA3180)
CID4 (KX-TDA3193)
BRI2 (KX-TDA3284)
IP-GW4 (KX-TDA3480)
DLC8 (KX-TDA3172)
DLC4 (KX-TDA3171)
SLC8 (KX-TDA3174)
SLC4 (KX-TDA3173)
DPH4 (KX-TDA3161)
DPH2 (KX-TDA3162)
4 Hybrid Extension Port
RMT (KX-TDA3196)
Main Board
ECOH8 (KX-TDA3166)
EXT-CID (KX-TDA3168)
MSG2 (KX-TDA3191)
Mountable Equipment
DPT
KX-T7636/KX-T7633
PC
DSS Console
CS
PS
Voice Processing System
SLT
Wireless Phone
Fax Machine
IP-type Private Network
Router
Doorphone & Door Opener
APT
DPT
DSS Console
Voice Processing System
SLT
Wireless Phone
Fax Machine
CS
PS
Batteries
AC Adaptor
Optional AC Adaptor
Amplifier
Pager/Speaker
Radio
LAN
Station Message Detail Recording (SMDR)
PC
PC
Server PC

1.3 Options

1.3.1 Options

Model No.	Model Name	Description	Maximum Quantity
KX-TDA3161	4-Port Doorphone Card (DPH4)	4-port doorphone card for 4 doorphones, 4 door openers (relays) and 4 sensors.	1
KX-TDA3162	2-Port Doorphone Card (DPH2)	2-port doorphone card for 2 doorphones, 2 door openers, 4 relays, and 4 sensors.	1
KX-TDA3166	8-Channel Echo Canceller Card (ECHO8)	8-channel card for echo cancellation in the Conference Mode.	1
KX-TDA3168	Extension Caller ID Card (EXT-CID)	Sends Caller ID signal for extension ports.	1
KX-TDA3171	4-Port Digital Extension Card (DLC4)	4-port digital extension card for DPTs, DSS consoles, DPT Interface CSs, and VM.	1
KX-TDA3172	8-Port Digital Extension Card (DLC8)	8-port digital extension card for DPTs, DSS consoles, DPT Interface CSs, and VM.	2
KX-TDA3173	4-Port Single Line Telephone Extension Card (SLC4)	4-port extension card for SLTs.	1
KX-TDA3174	8-Port Single Line Telephone Extension Card (SLC8)	8-port extension card for SLTs.	2
KX-TDA3180	4-Port Analogue Trunk Card (LCOT4)	4-port analogue Trunk card. Only two ports of the first installed LCOT4 card are available in the event of power failure.	3
KX-TDA3191	2-Channel Message Card (MSG2)	2-channel message card.	2
KX-TDA3193	4-Port Caller ID Card (CID4)	4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card.	3
KX-TDA3196	Remote Card (RMT)	Analogue modem card for remote communication with the Hybrid IP-PBX. V90 support.	1
KX-TDA3280	2-Port BRI Card (BRI2)	2-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.	3
KX-TDA3480	4-Channel VoIP Gateway Card (IP-GW4)	4-channel VoIP gateway card. VoIP H.323 V.2, ITU-T G.729a, G.723.1 and G.711 compliant.	1

Model No.	Model Name	Description	Maximum Quantity
KX-A236	Additional AC Adaptor and AC Cord	AC adaptor and AC cord for system expansion.	1

1.4 Specifications

1.4.1 General Description

Switching		Non Blocking Distributed Time Switch
AC Adaptor	**AC Input**	100 V AC to 240 V AC, 1.5 A, 50 Hz/60 Hz
	DC Output	40 V, 1.38 A (55.2 W)
DC Input		• DC IN 1: 40 V, 1.38 A (55.2 W) • DC IN 2: 40 V, 1.38 A (55.2 W)
Maximum Power Failure Tolerance		300 ms
Memory Backup Duration		7 years
Dialling	**Trunk**	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
	Extension	Dial Pulse (DP) 10 pps, 20 pps Tone (DTMF) Dialling
Connectors	**Trunk**	RJ45/RJ11 (2 wire) × each trunk port
	Extension	RJ45/RJ11 (4 wire) × each extension port
	Paging Output	1 conductor jack
	External MOH Output	1 conductor jack
Mode Conversion		DP-DTMF, DTMF-DP
Ring Frequency		20 Hz/25 Hz (selectable)
Central Office Loop Limit		1600 Ω maximum
Operating Environment	**Temperature**	0 °C to 40 °C
	Humidity	10 % to 90 % (non condensing)
Conference Call Trunk		From 5 × 3-party conference call to 2 × 8-party conference call
Music on Hold (MOH)		1 port (Level Control: -6 dB to +6 dB in 3 dB steps) Selectable Tone/External Music Source port
Paging	**Internal**	Level Control: -6 dB to +3 dB in 3 dB steps
	External	1 port (Volume Control: -15 dB to +6 dB in 3 dB steps)
Serial Interface Port	**RS-232C**	1 (max 115.2 kbps)
	USB	1

Extension Connection Cable	SLT	1 pair wire (T, R)
	DPT	1-pair wire (D1, D2) or 2-pair wire (T, R, D1, D2)
	APT	2-pair wire (T, R, D1, D2)
	DSS Console and Add-on Key Module	1-pair wire (D1, D2)
Dimension	275 mm (W) × 376 mm (H) × 117 mm (D)	
Weight (when fully mounted)	Under 3.5 kg	

1.4.2 Characteristics

Terminal Equipment Loop Limit	• PT: KX-T7600 series: 90 Ω; all other DPTs/APTs: 40 Ω • SLT: 600 Ω including set • Doorphone: 20 Ω • CS: 65 Ω
Minimum Leakage Resistance	15 000 Ω maximum
Maximum Number of Extension Instruments per Line	**1** for PT or SLT **2** by Parallel or eXtra Device Port connection of a PT and an SLT
Ring Voltage	75 Vrms at 20 Hz/25 Hz depending on the Ringing Load
Trunk Loop Limit	1600 Ω maximum
Hookswitch Flash/Recall Timing Range	24 ms to 2032 ms
BRI Cards Internal ISDN Mode	Supply Voltage: 40 V Power Supply: 4.5 W per 1 line, 5 W per 2 lines (Under consideration) Power Supply Method: Phantom Power Supply
Door Opener Current Limit	24 V DC/30 V AC, 1 A maximum
Paging Terminal Impedance	600 Ω
MOH (Music on Hold) Terminal Impedance	10 000 Ω

1.4.3 System Capacity

Maximum Number of Cards for Each Slot

The following number of trunk and extension cards can be installed in the Hybrid IP-PBX for expansion.

Slot Type	Card Type	Total Number of Cards	Total Number of Cards for Slot
Semi Free	DLC8+SLC8	2	3
	IP-GW4	1	
Specified	DLC4/SLC4	1	3
	BRI2	3	
	LCOT4	3	
Option	MSG2	2	4
	DPH4/DPH2	1	
	ECHO8	1	
	EXT-CID	1	
RMT	RMT	1	1

Notes

- For each card, a maximum number that can be installed in the Hybrid IP-PBX is listed in "1.3.1 Options".
- Any card that exceeds the capacity of the Hybrid IP-PBX will be ignored.
- When the Hybrid IP-PBX starts up with an invalid configuration mode, some cards will be ignored.

Maximum Terminal Equipment

The following number of terminal equipment can be supported by the Hybrid IP-PBX.

Terminal Equipment Type	With the Supplied AC Adaptor only	With the Supplied AC Adaptor and an Additional AC Adaptor
SLT	24 (Total)	24 (Total)
DPT (KX-T7600 series)		
DPT (KX-T7200, KX-T7400)	4 (Total)	24 (Total)
APT		
CS	4	8
PS	28	28
VM	1	1
Doorphone	4	4
Door Opener	4	4

Terminal Equipment Type	With the Supplied AC Adaptor only	With the Supplied AC Adaptor and an Additional AC Adaptor
SLT+DPT+APT+CS+VM	28[*1]	28[*1]
DPT (KX-T7200, KX-T7400)+APT+CS	8[*1]	24

[*1] The maximum number of each terminal equipment is described above.

Section 2
Installation

This section describes the procedures to install the Hybrid IP-PBX. Detailed instructions for planning the installation site, installing the shelves and optional service cards, and cabling of peripheral equipment are provided. Further information on system expansion and peripheral equipment installation is included.

2.1 Before Installation

2.1.1 Before Installation

Please read the following notes concerning installation and connection before installing the Hybrid IP-PBX. Be sure to comply with applicable local regulations (e.g., law, guidelines).

Safety Installation Instructions

When installing telephone wiring, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

1. Never install telephone wiring during a lightning storm.
2. Never install telephone jacks in wet locations unless the jack is specifically designed for wet locations.
3. Never touch uninsulated telephone wires or terminals unless the telephone line has been disconnected at the network interface.
4. Use caution when installing or modifying telephone lines.
5. Anti-static precautions should be taken during installation.

Installation Precautions

This set is made for wall mounting. Avoid installing in the following places. (Doing so may result in malfunction, noise, or discolouration.)

1. In direct sunlight and hot, cold, or humid places.
   Temperature range: 0 °C to 40 °C
2. Sulphuric gases produced in areas where there are thermal springs, etc. may damage the equipment or contacts.
3. Places in which shocks or vibrations are frequent or strong.
4. Dusty places, or places where water or oil may come into contact with the unit.
5. Near high-frequency generating devices such as sewing machines or electric welders.
6. On or near computers, telexes, or other office equipment, as well as microwave ovens or air conditioners. (It is preferable not to install in the same room with the above equipment.)
7. Closer than 1.8 m from radios and televisions (both the Hybrid IP-PBX and PTs).
8. Do not obstruct the area around the Hybrid IP-PBX (for reasons of maintenance and inspection—be especially careful to allow space of at least 20 cm for cooling above and at least 10 cm at the sides of the Hybrid IP-PBX).
9. Do not block the openings at top of the Hybrid IP-PBX.
10. Do not stack up the optional service cards.

Wiring Precautions

Be sure to follow these instructions when wiring.

1. Do not wire the telephone cable in parallel with an AC power source, computer, telex, etc. If the cables are run near those wires, shield the cables with metal tubing or use shielded cables and ground the shields.
2. If cables are run on the floor, use protectors to prevent the wires from being stepped on. Avoid wiring under carpets.

3. Avoid using the same power supply outlet for computers, telexes, and other office equipment. Otherwise, Hybrid IP-PBX operation may be interrupted by the induction noise from such equipment.
4. Please use 1-pair telephone wire for extension connection of (telephone) equipment such as standard telephones, data terminals, answering machines, computers, Voice Processing Systems, etc., except PTs (e.g., KX-T7600 series).
5. The power switch of the Hybrid IP-PBX must be off during wiring. After the wiring is completed, turn the power switch on.
6. Mis-wiring may cause the Hybrid IP-PBX to operate improperly.
7. If an extension does not operate properly, disconnect the telephone from the extension line and then connect again, or turn the power to the Hybrid IP-PBX off and on again.
8. The Hybrid IP-PBX is equipped with a 3-wire earthing type plug. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the earthing-type plug.
9. Use twisted pair cable for trunk connection.
10. Trunks should be installed with lightning protectors. For details, refer to "2.2.11 Lightning Protector Installation".

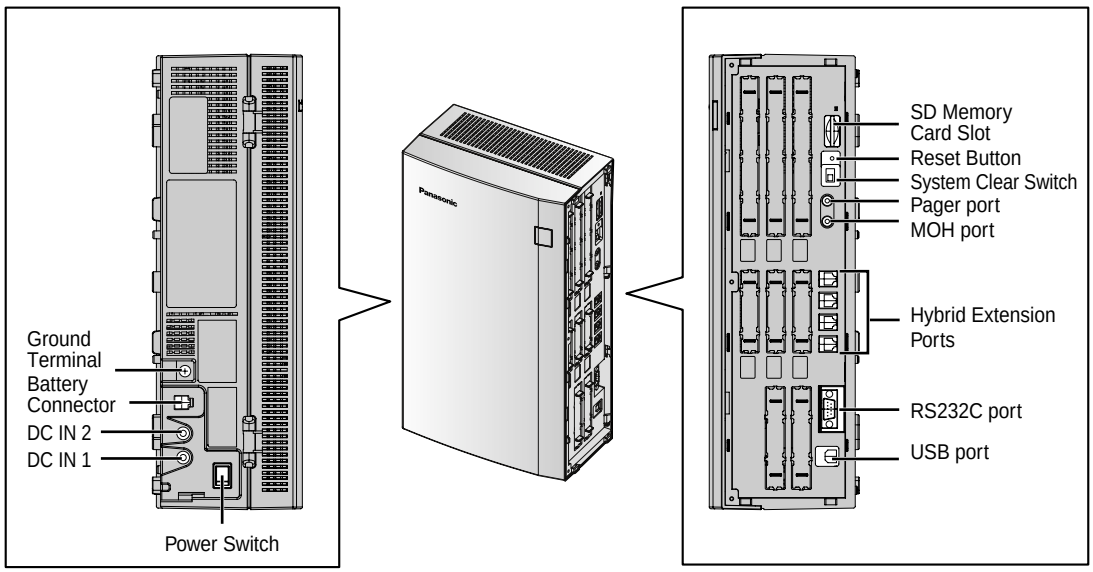
2.2 Installation of the Hybrid IP-PBX

2.2.1 Unpacking

Unpack the box and check the items below:

Main Unit	1
AC Cord	1
AC Adaptor	1
Screws for Wall Mounting	5
Washers	5
Mini Plug (for pager and music source)	2
SD Memory Card	1
Strap	1

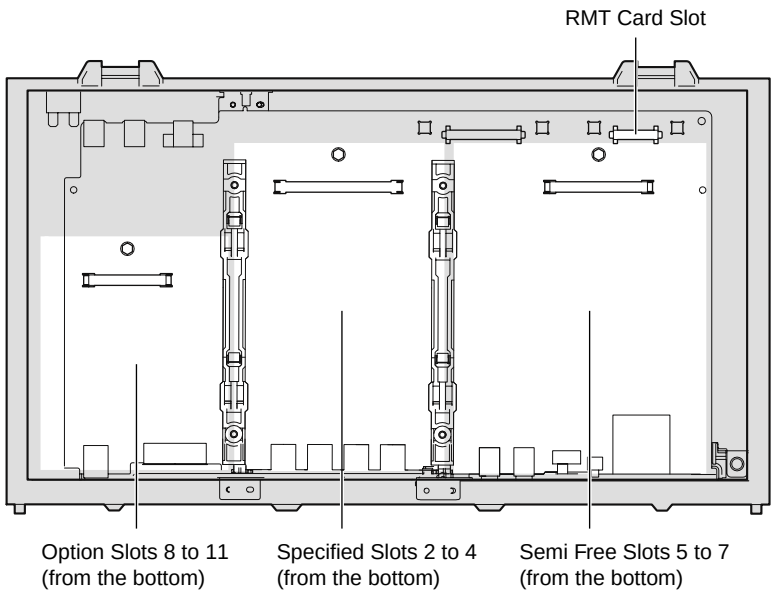
2.2.2 Names and Locations



Notes

- **DC IN 1**: Used for an AC adaptor which is supplied with the Hybrid IP-PBX.
  DC IN 2: Used for an additional AC adaptor.
- For details about connecting peripherals, refer to "2.10.1 Connection of Peripherals".
- For details about System Clear Switch, refer to "2.12.1 Starting the Hybrid IP-PBX".
- For details about Reset Button, refer to "4.1.4 Using the Reset Button".

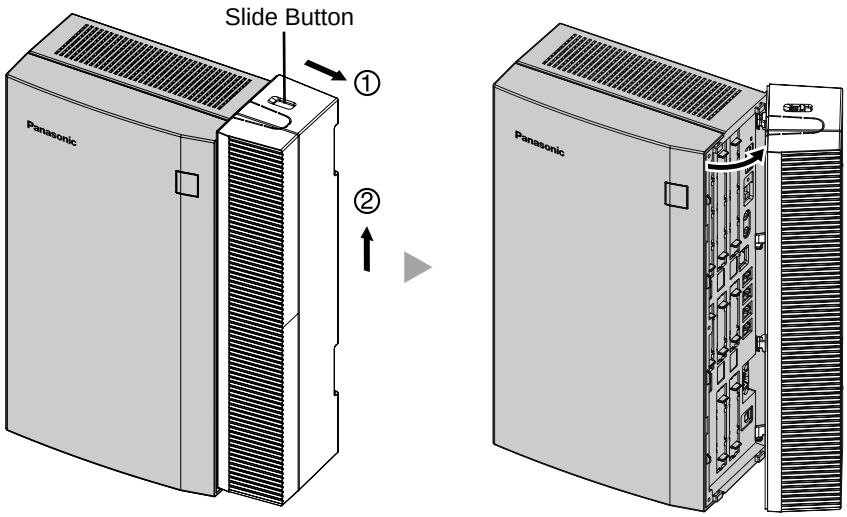
Inside View


RMT Card Slot
Option Slots 8 to 11 (from the bottom)
Specified Slots 2 to 4 (from the bottom)
Semi Free Slots 5 to 7 (from the bottom)

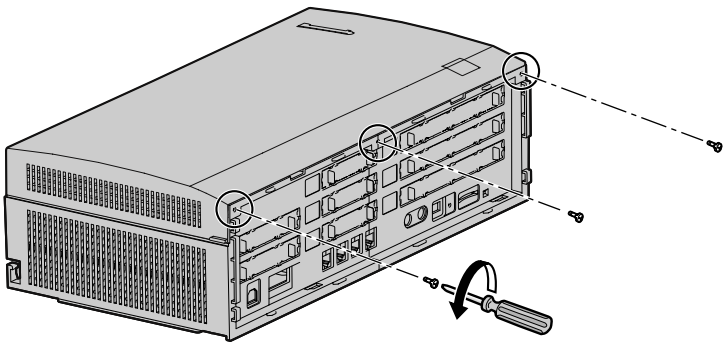
2.2.3 Opening/Closing the Covers

Opening the Covers

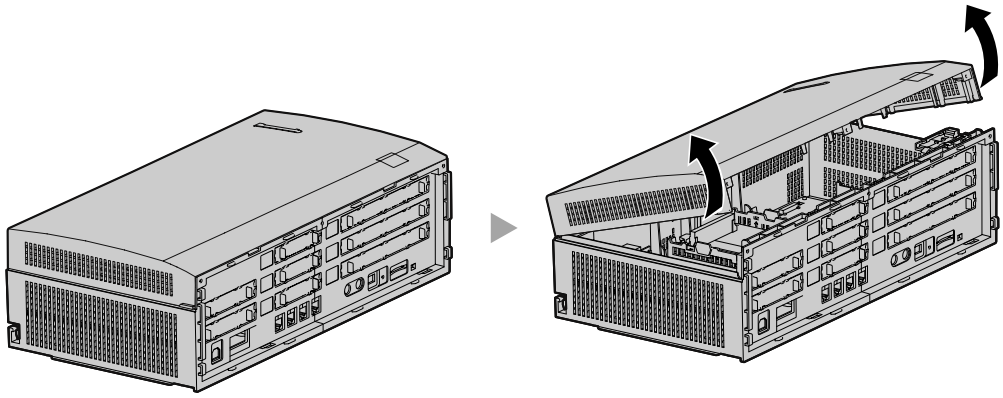
1. Move the slide button to the right, and slide the cable cover upwards. Then remove the cable cover by rotating it in the direction of the arrow.



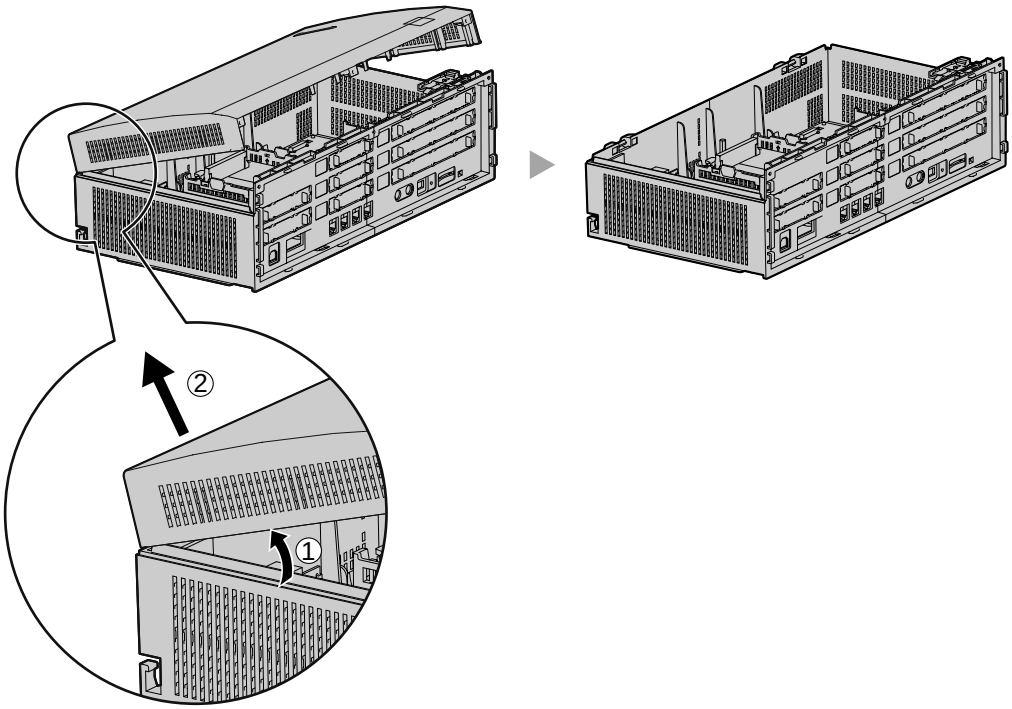
2. Loosen three screws.



3. Open the front cover, holding the protrusions on the both sides of the front cover.

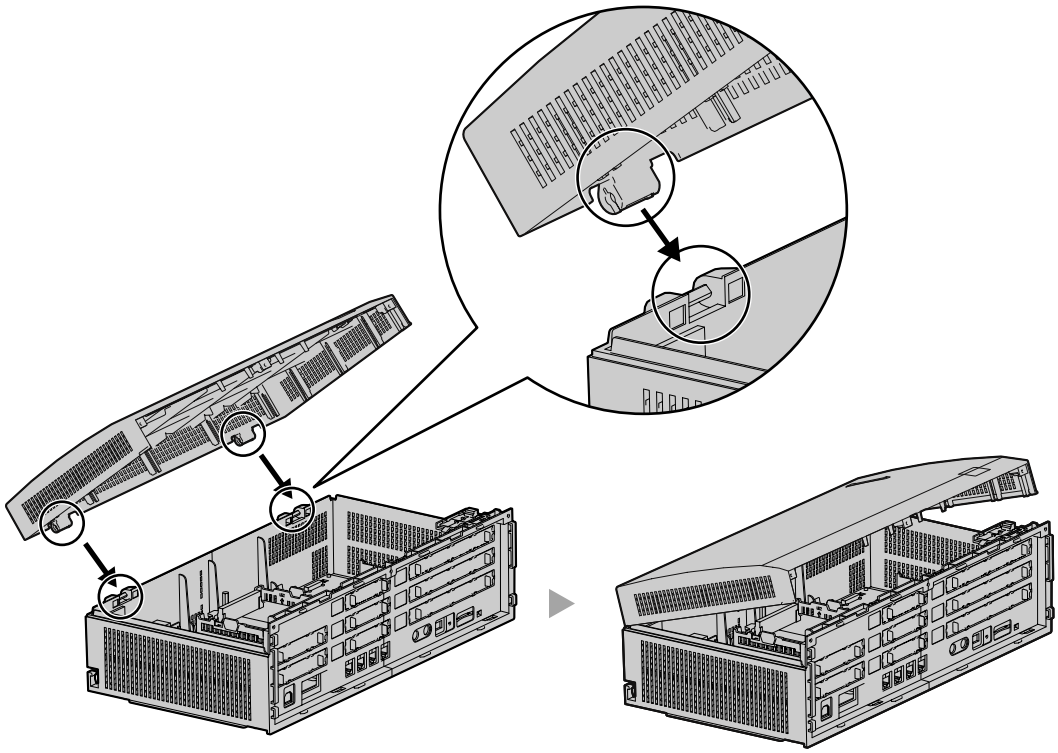


4. Remove the front cover, pushing it in the direction of the arrow.

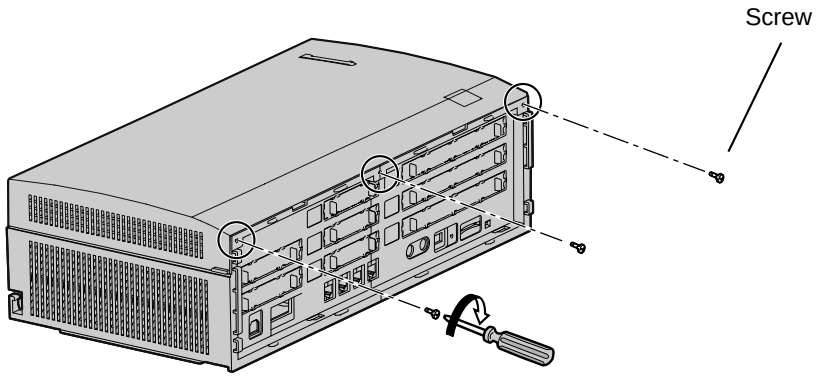


Closing the Covers

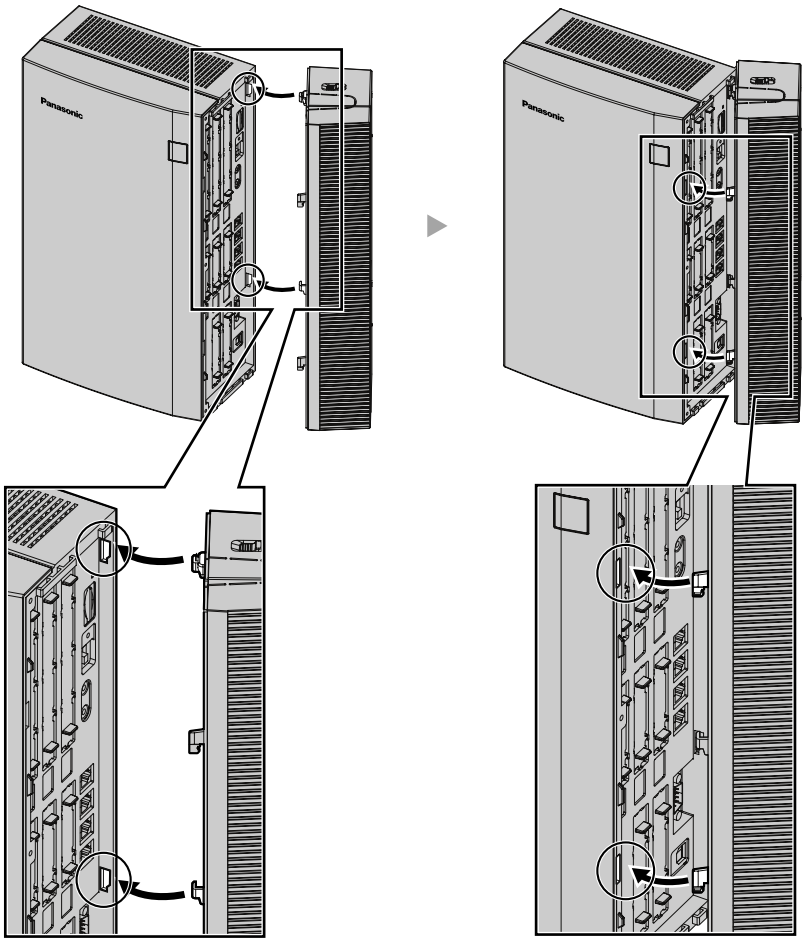
1. Fit the front cover to the main unit as shown below, and then close the front cover.



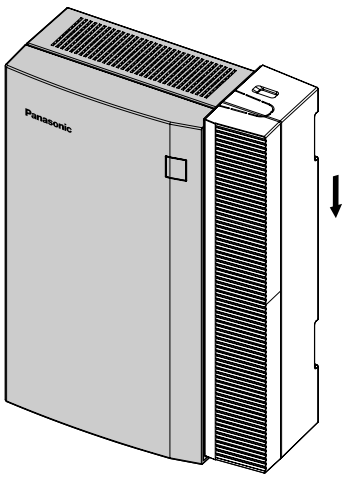
2. Tighten three screws.



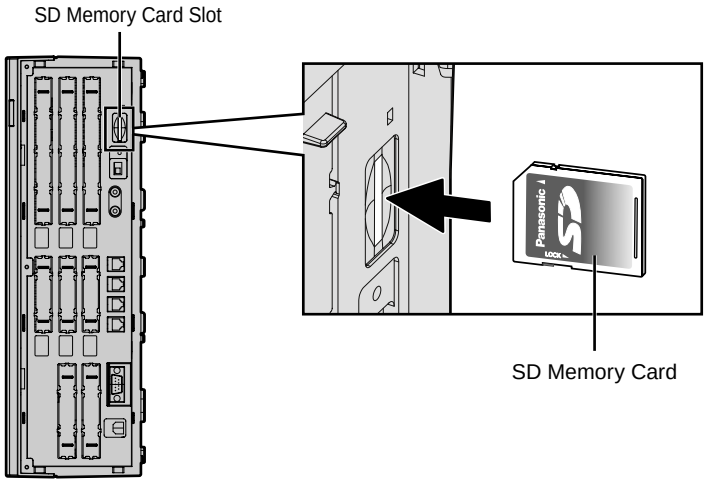
3. Fit the protrusions on the cable cover to the receptacles on the main unit.



4. Slide the cable cover in the direction of the arrow until it locks.



2.2.4 Installation of the SD Memory Card



CAUTION

- Use only the SD Memory Card included with the Hybrid IP-PBX.
- SD Memory Card contains software for all processes of the Hybrid IP-PBX and all customer data. The SD Memory Card must be inserted before start up.
- Do not remove the SD Memory Card during the operation of the Hybrid IP-PBX. Removing SD Memory Card during the operation may cause damage to the SD Memory Card, or result in loss of data.

LED Indications

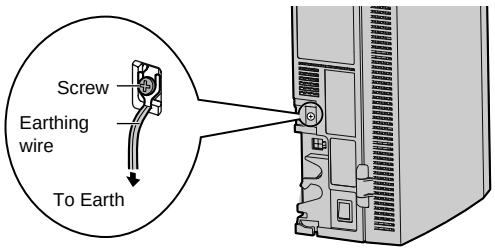
Colour	Description
Green	SD memory card status • ON: Accessing

2.2.5 Frame Earth Connection

IMPORTANT

Connect the frame of the Hybrid IP-PBX to earth.

1. Loosen the screw.
2. Insert an earthing wire (user-supplied)*.
3. Tighten the screw.
4. Connect the earthing wire to earth.



* For earthing wire, green-and-yellow insulation is required, and the cross-sectional area of the conductor must be more than 0.75 mm^2 or 18 AWG.

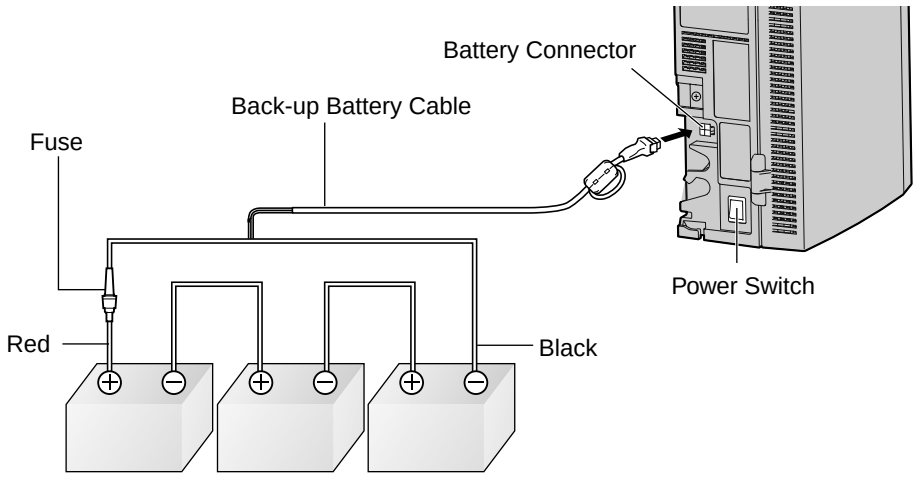
- Be sure to comply with applicable local regulations (e.g., law, guidelines).
- Proper earthing (connection to earth) is very important to protect the Hybrid IP-PBX from the bad effects of external noise or to reduce the risk to the user of electrocution in the case of lightning strike.
- The earthing wire of the AC cable has an effect against the external noise and lightning strikes, but it may not be enough to protect the Hybrid IP-PBX. A permanent connection between earth and the earth terminal of the Hybrid IP-PBX must be made.

2.2.6 Backup Batteries Connection

The backup batteries and Back-up Battery Cable provide backup power supply to allow full use of the Hybrid IP-PBX in the event of a power failure. In case of power failure, the backup batteries automatically maintain the power for the Hybrid IP-PBX without interruption.

Be sure to comply with applicable local regulations (e.g., law, guidelines).

1. Turn off the power switch of the Hybrid IP-PBX.
2. Connect the Back-up Battery Cable with 3 identical VRLA (Valve Regulated Lead Acid) batteries (12 V DC × 3).



Backup Batteries (12 V DC x 3)

- Turn on the power switch of the Hybrid IP-PBX only after the installation of the Hybrid IP-PBX is finished and AC power is turned on.
- For 1 backup battery, battery capacity of 28 Ah or below is recommended (otherwise, the backup battery may not be charged).
- Make sure that the type and capacity of the 3 backup batteries are identical.
- The Back-up Battery Cable should not be exposed to direct sunlight. Keep the Back-up Battery Cable and the backup batteries away from heating appliances and fire. Place the backup batteries in ventilated place.
- For details about the backup batteries, refer to the manual intended for the batteries.

CAUTION

- Make sure that the polarities of the backup batteries and wiring are correct.
- Make sure that you do not short the backup batteries or cables.
- There is a danger of explosion if backup batteries are incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.
- Use the correct type of Back-up Battery Cable.

2.2.7 Installing/Removing the Optional Service Cards

Slot Condition

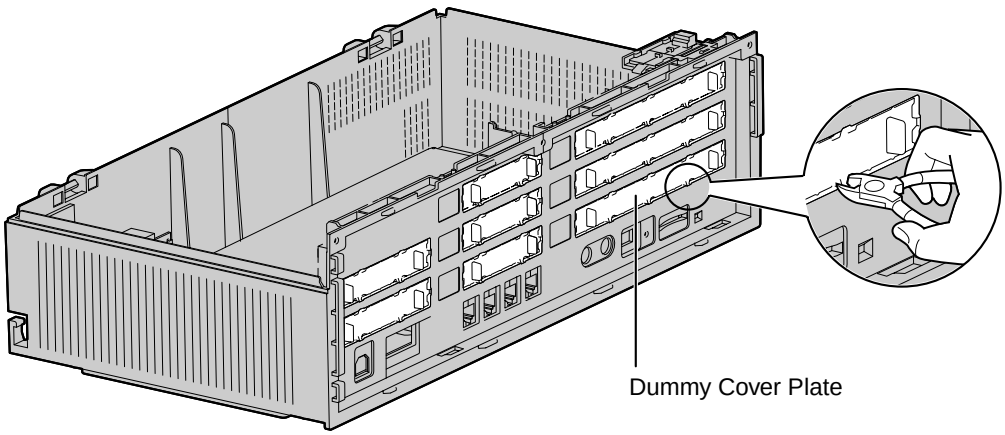
Slot Type	Card Type
Semi Free Slots	DLC8, SLC8, IP-GW4
Specified Slots	DLC4, SLC4, BRI2, LCOT4
Option Slots	MSG2, DPH4, DPH2, ECHO8, EXT-CID
RMT Slot	RMT

CAUTION

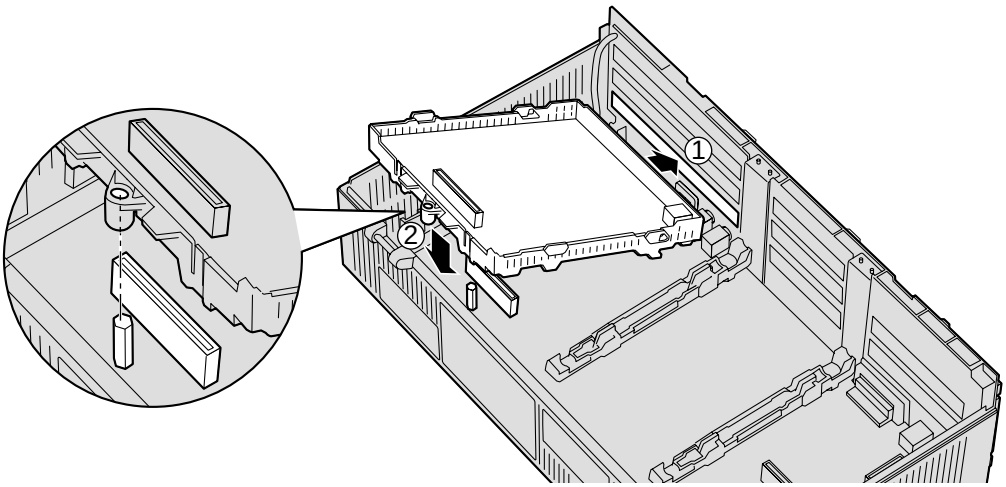
To protect the main board from static electricity, do not touch parts on the main board in the main unit and on the optional service cards. To discharge static, touch ground or wear an earthing strap.

Installing Optional Service Cards

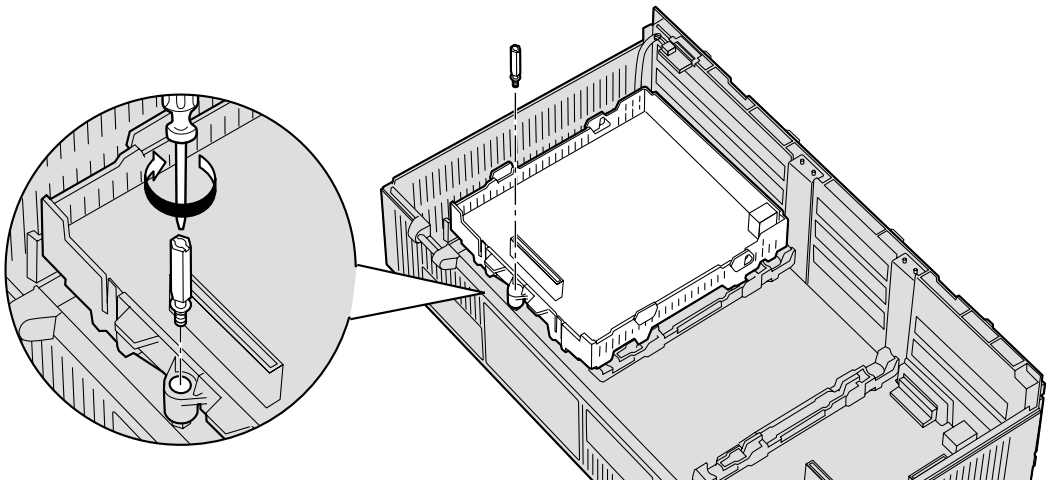
1. Before installing the optional service cards, cut and remove the appropriate dummy cover plates of the cabinet. For safety reasons, smooth the cut edges.



2. Install the card as follows.

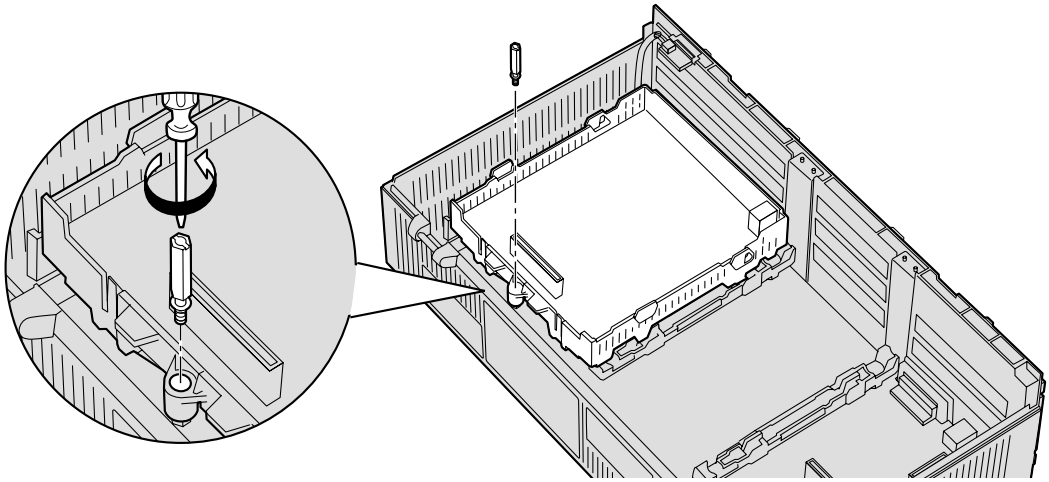


3. Insert the extension bolt into the hole of the card, and tighten it for secure the card.

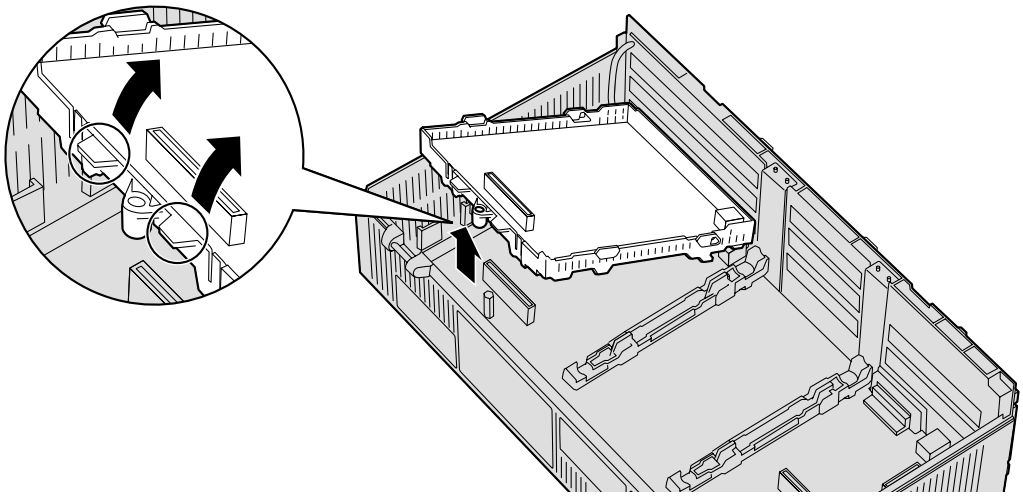


Removing the Optional Service Cards

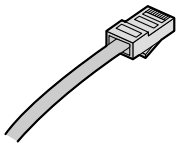
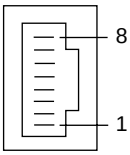
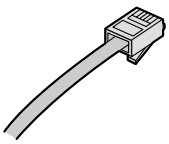
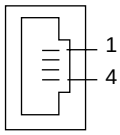
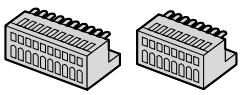
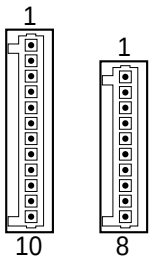
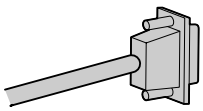
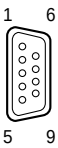
1. Untighten the extension bolt.

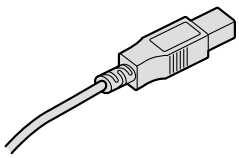
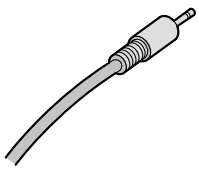
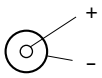


2. Pull the card in the direction of the arrow, holding the protrusions of the card.



2.2.8 Types of Connectors

Connector Type	Pin Number	Used for
RJ45  (Twisted pair cable)		• DLC4 (KX-TDA3171NE) • DLC8 (KX-TDA3172NE) • SLC4 (KX-TDA3173NE) • SLC8 (KX-TDA3174NE) • LCOT4 (KX-TDA3180NE) • DPH4 (KX-TDA3161NE) • DPH2 (KX-TDA3162) • BRI2 (KX-TDA3280) • IP-GW4 (KX-TDA3480) • Main Board (Hybrid Extension Ports)
RJ11  (Twisted pair cable)		• DLC4 (KX-TDA3171) • DLC8 (KX-TDA3172) • SLC4 (KX-TDA3173) • SLC8 (KX-TDA3174) • LCOT4 (KX-TDA3180) • DPH4 (KX-TDA3161) • Main Board (Hybrid Extension Ports) **Notice** In certain countries/areas, the RJ11 connector is used for the hybrid extension ports.
10-pin Terminal Block 8-pin Terminal Block 		• DPH4 (KX-TDA3161) • DPH2 (KX-TDA3162)
RS-232C 		• Main Board

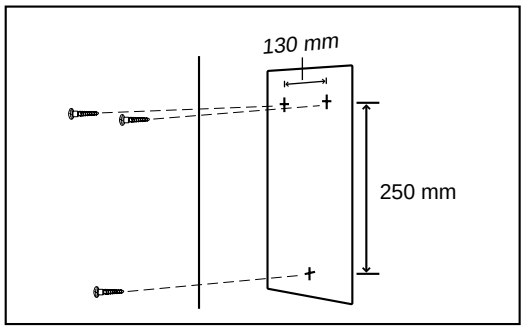
Connector Type	Pin Number	Used for
USB 		• Main Board
Mini Plug 		• Main Board (Pager port, MOH port)

2.2.9 Wall Mounting (KX-TDA30)

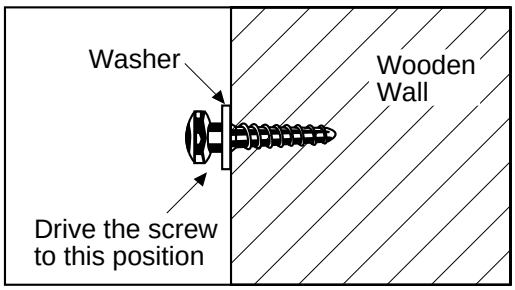
CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

1. Place the reference for wall mounting on the last page of this manual on the wall to mark three screw positions.



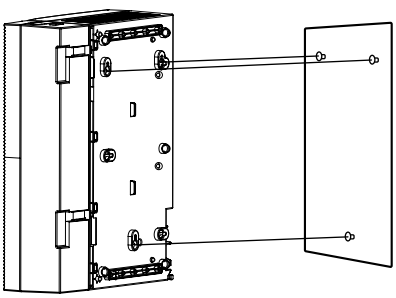
2. Install the screws and washers (included) to the wall.



Notes

- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the main unit on the screw heads.



Notes

- Do not block the openings of the cabinet. Allow space of at least 10 cm above and at the sides of the cabinet.
- Make sure that the wall behind the cabinet is flat and free of obstacles, so that the openings on the back of the cabinet will not be blocked.
- Make sure that the wall behind the cabinet is not made of wood.

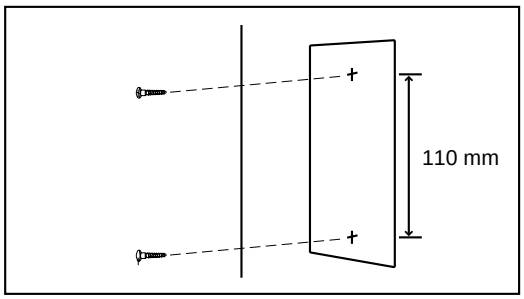
- Be careful not to drop the cabinet.

2.2.10 Wall Mounting (AC Adaptor)

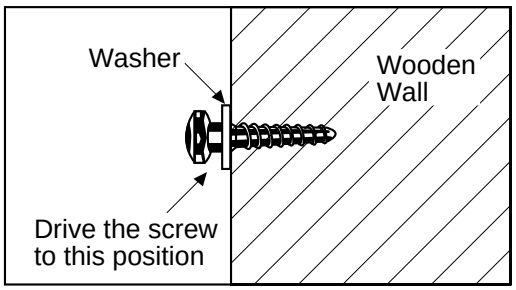
CAUTION

Drive mounting screws into the wall. Be careful to avoid touching any metal laths, wire laths or metal plates in the wall.

1. Place the reference for wall mounting on the following page on the wall to mark two screw positions.



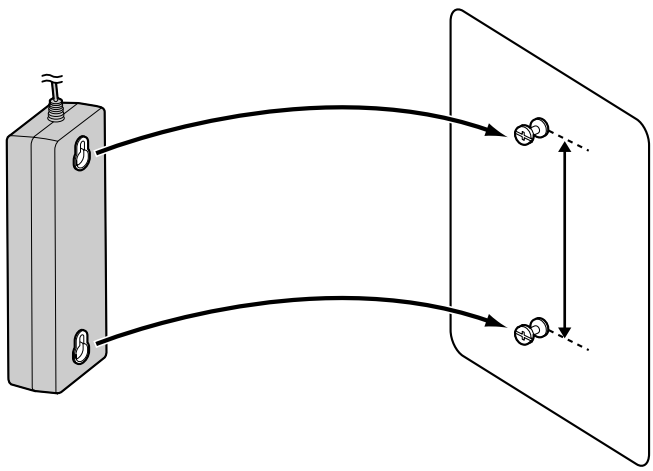
2. Install the screws and washers (included) to the wall.



Notes

- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the AC adaptor on the screw heads.

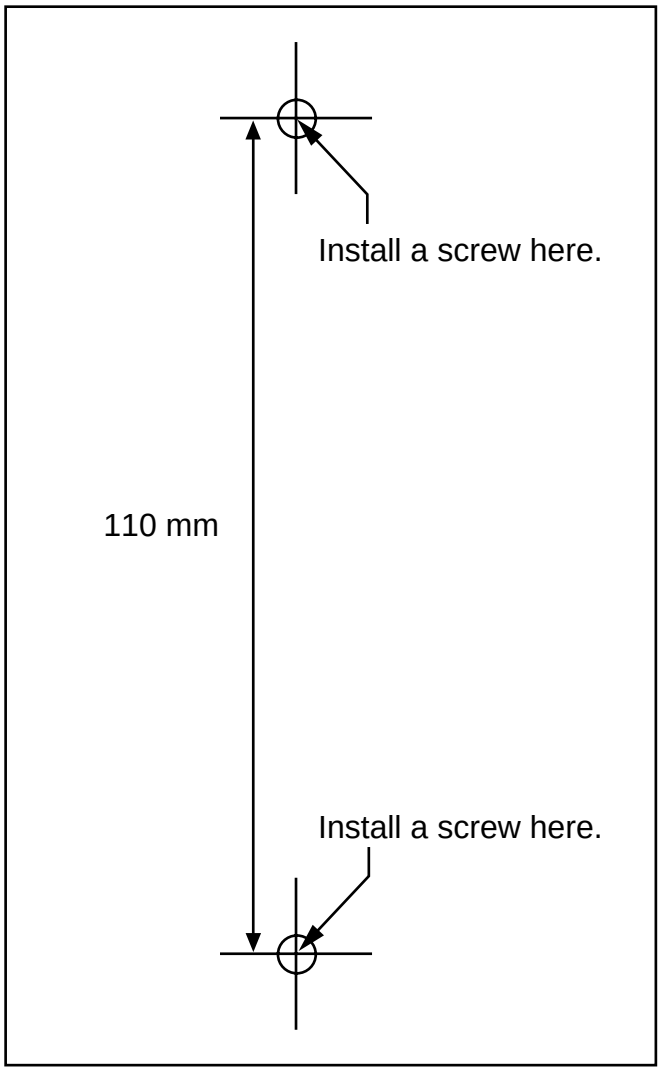


Note

Be careful not to drop the AC Adaptor.

Reference for Wall Mounting

Please copy this page and use as a reference for wall mounting.



Note

When you print out this page, the distance on the paper output may deviate slightly fromthe number indicated above.

2.2.11 Lightning Protector Installation

Overview

A lightning protector is a device to be installed on a trunk to prevent a dangerous surge from entering the building and damaging equipment.

A dangerous surge can occur if a telephone line comes in contact with a power line. Trouble due to lightning surges has been showing a steady increase with the development of electronic equipment.

In many countries/areas, there are regulations requiring the installation of lightning protection. A lightning strike to a telephone cable which is 10 m above ground can be as high as 200 000 V.

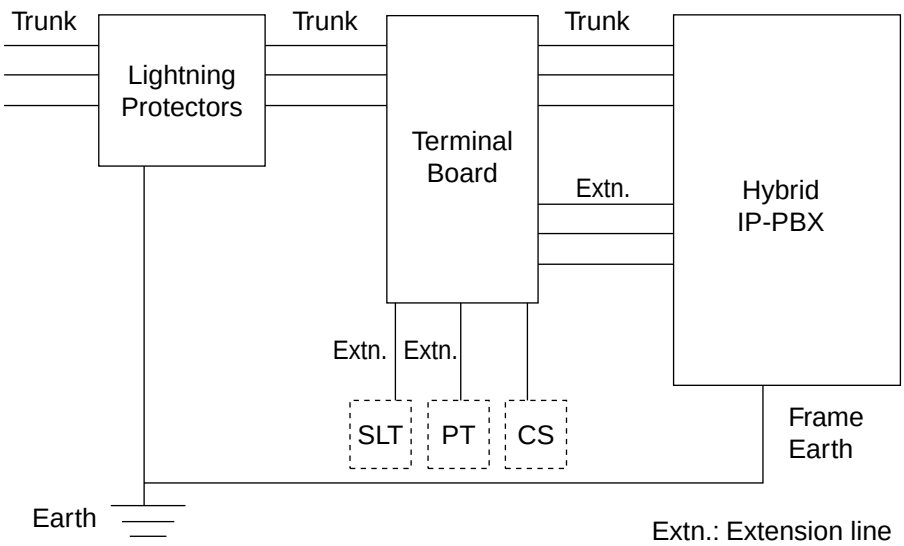
The Hybrid IP-PBX should be installed with lightning protectors. In addition, earthing (connection to earth) is very important for the protection of the Hybrid IP-PBX.

Be sure to comply with applicable local regulations (e.g., law, guidelines).

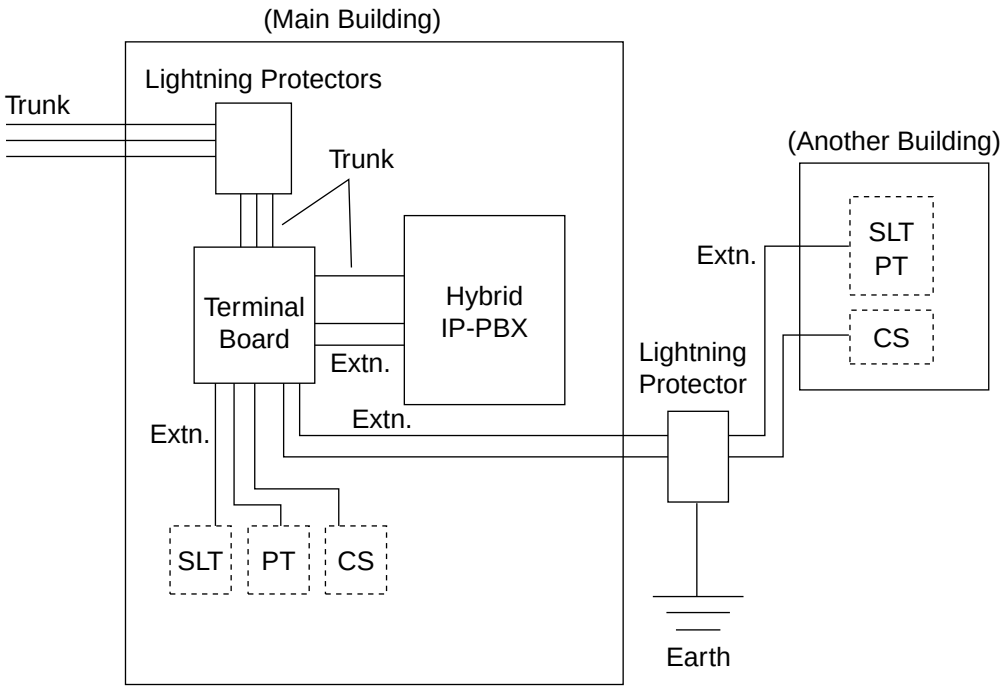
Recommended Lightning Protectors

- KX-A207
- TELESPIKE BLOK MODEL TSB (TRIPPE MFG. CO.)
- SPIKE BLOK MODEL SK6-0 (TRIPPE MFG. CO.)
- Krone 237A strips fitted with 14A/1 surge arrestors
- Super MAX™ (PANAMAX)
- MP1 (ITW LINK)

Installation



Outside Installation



Extn.: Extension Line

If you install an extension outside of the main building, the following precautions are recommended:

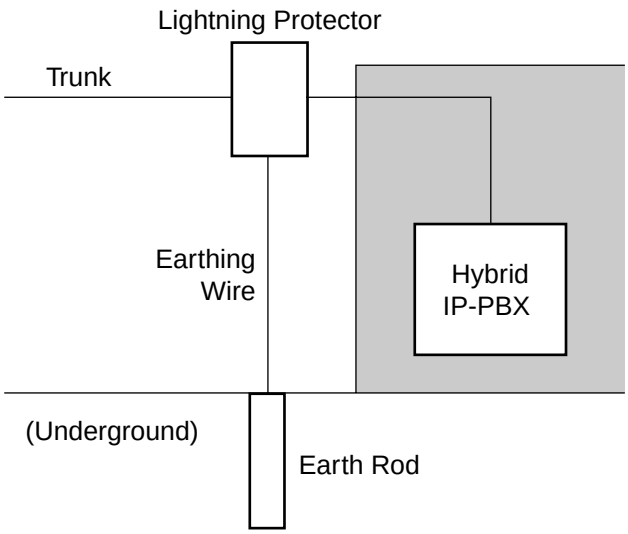
a. Install the extension wire underground.

b. Use a conduit to protect the wire.

Note

The lightning protector for an extension and CS is different from that for trunks.

Installation of an Earth Rod



1. Installation location of the earth rod.....Near the protector
2. Check obstructions.....None
3. Composition of the earth rod.....Metal
4. Depth of the earth rod.....More than 50 cm
5. Cross sectional area of the earthing wire.....More than 1.3 mm^2

Notes

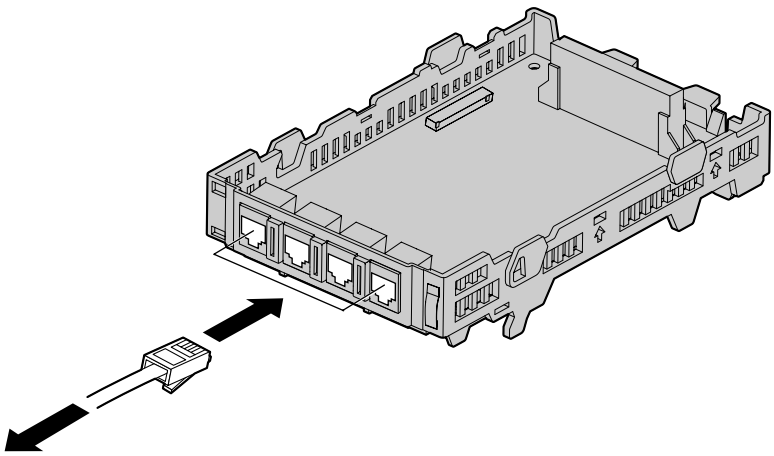
- The above figures are recommendations only.
- The length of earth rod and the required depth depend on the composition of the soil.

2.3 Installation of the Trunk Cards

2.3.1 LCOT4 Card

Function

4-port analogue Trunk card. Only two ports of the first installed LCOT4 card are available in the event of power failure. To be installed in the Specified Slot. One CID4 card can be mounted on the LCOT4 card (refer to "2.3.2 CID4 Card").



To trunk

Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector/RJ11 connector

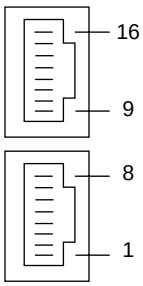
Notice

- The connector type may be RJ45 or RJ11 depending on the country/area.
- Shown above is a card having the RJ45 connectors.

Note

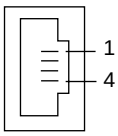
To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

RJ45 Connector Pin Assignments



No.	Signal Name	Function
1/9	Reserved	–
2/10	Reserved	–
3/11	Reserved	–
4/12	T	Tip
5/13	R	Ring
6/14	Reserved	–
7/15	Reserved	–
8/16	Reserved	–

RJ11 Connector Pin Assignments

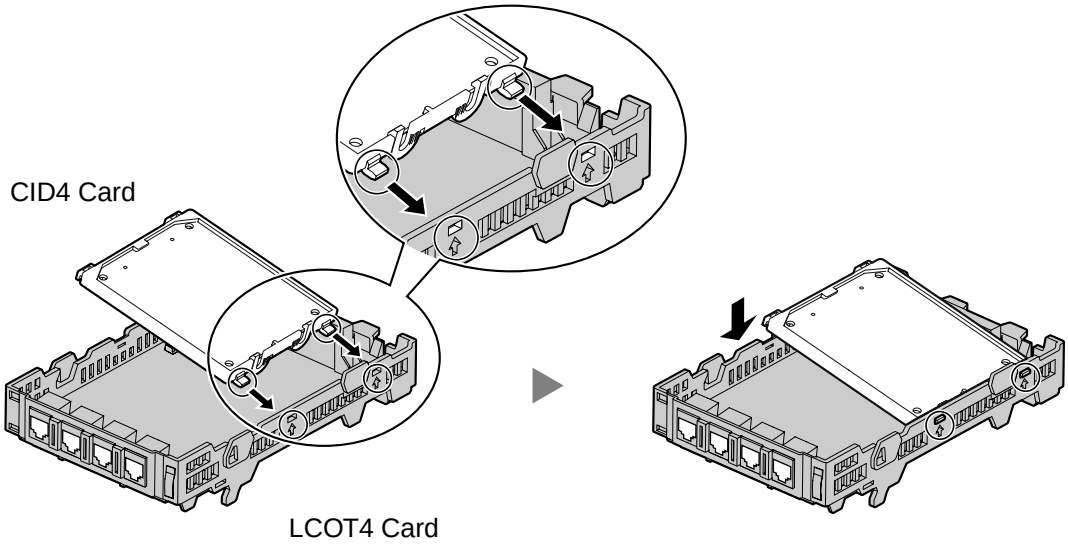


No.	Signal Name	Function
1	Reserved	–
2	R	Ring
3	T	Tip
4	Reserved	–

2.3.2 CID4 Card

Function

4-port Caller ID signal type FSK/FSK (with Call Waiting Caller ID [Visual Caller ID])/DTMF. To be mounted on the LCOT4 card.



Accessory and User-supplied Items

Accessory (included): none

User-supplied (not included): none

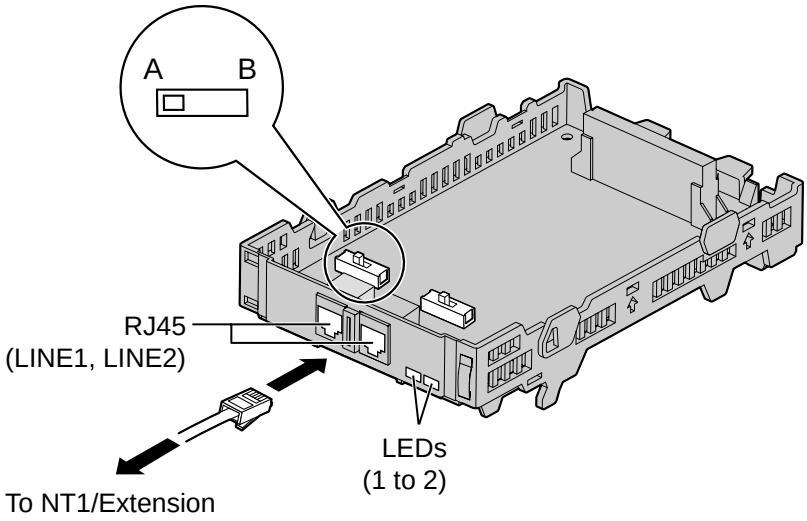
Note

Only 1 CID4 card can be mounted on the LCOT4 card.

2.3.3 BRI2 Card

Function

2-port ISDN Basic Rate Interface card with 1 power failure transfer port. EURO-ISDN/ETSI compliant.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector

Notes

- When connecting these optional service cards to the trunk, connect through NT1; do not connect to the trunk directly.
- This optional service card has 100 Ω of terminal resistance. For use of point to multi-point connection, the card must be placed at the end of the bus.
- This optional service card can be used for either trunk or extension connection, by setting the A/B switch or using the connector with appropriate pin assignments.
- For details about power failure transfer, refer to "2.11.1 Auxiliary Connection for Power Failure Transfer".
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

Notice

If the connected ISDN terminal has no external power source, make sure that the power is supplied from the BRI2 card by programming the Hybrid IP-PBX accordingly.

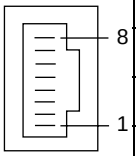
However, if there is an external power source to the terminal, make sure that there is no power supplied to the terminal from the BRI2 card. Failure to do so may cause damage to the power supply circuit of the BRI2 card or the terminal.

Switch Settings

Switch	Type	Usage and Status Definition
A/B	Slide	Select A (default) for trunk or B for extension use.

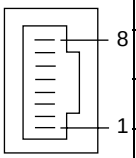
Pin Assignments

RJ45 Connector for Trunk Use



No.	Signal Name	Level [V]	Function
1-2	Reserved	–	–
3	TX1	(+)	Transmit data 1
4	RX2	(+)	Receive data 2
5	RX1	(-)	Receive data 1
6	TX2	(-)	Transmit data 2
7-8	Reserved	–	–

RJ45 Connector for Extension Use

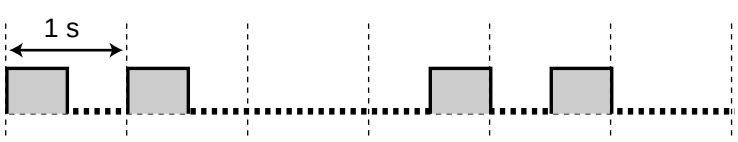


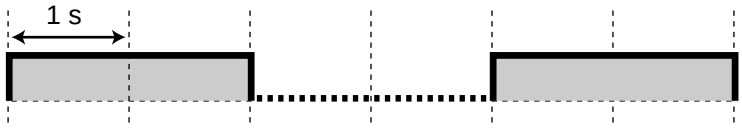
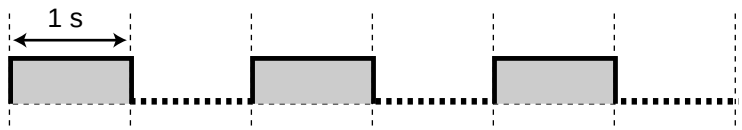
No.	Signal Name	Level [V]	Function
1-2	Reserved	–	–
3	RX2	(+)	Receive data 2
4	TX1	(+)	Transmit data 1
5	TX2	(-)	Transmit data 2
6	RX1	(-)	Receive data 1
7-8	Reserved	–	–

LED Indications

	Colour	Description
1	Green	LINE 1 status indication • OFF: L1 asynchronous • ON: Synchoronous/L2 link established/clock slave • Flash: Refer to "LINE LED Flash Pattern" below for details.
2	Green	LINE 2 status indication • OFF: L1 asynchronous • ON: Synchoronous/L2 link established/clock slave • Flash: Refer to "LINE LED Flash Pattern" below for details.

LINE LED Flash Pattern

L1	L2	Master Clock	Flash Pattern
ON	OFF	OFF	

L1	L2	Master Clock	Flash Pattern
ON	OFF	ON	
ON	ON	ON	

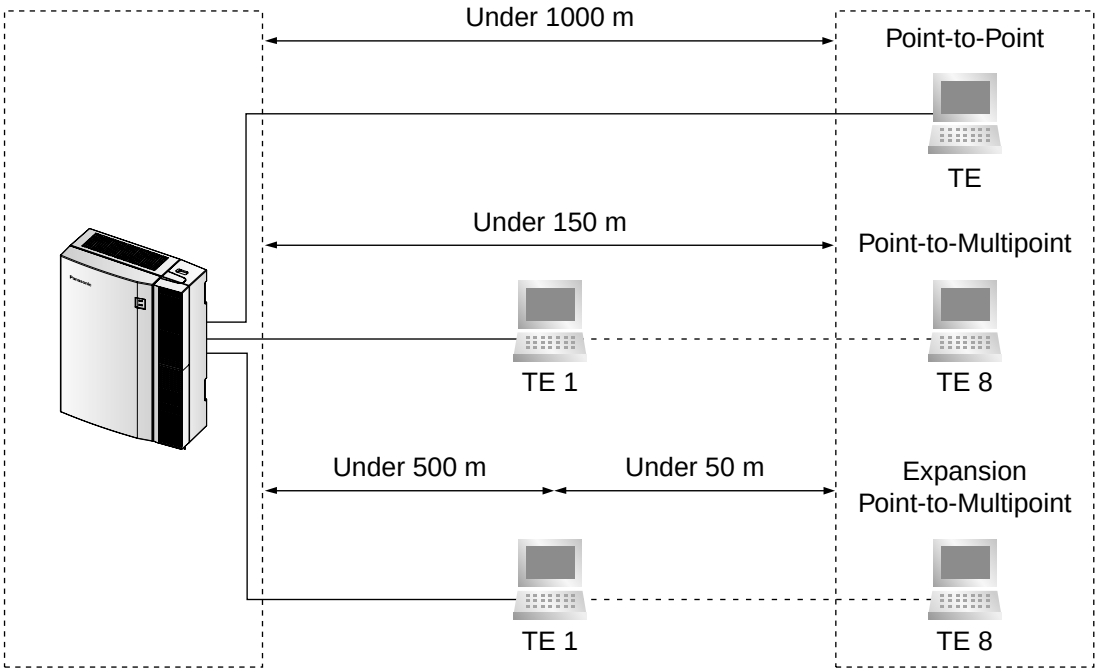
L1: ON (Synchronous)

L2: ON (Link established)/OFF (Link not established)

Master Clock: ON (Master)/OFF (Slave)

Maximum Cabling Distance of S0 Bus Connection

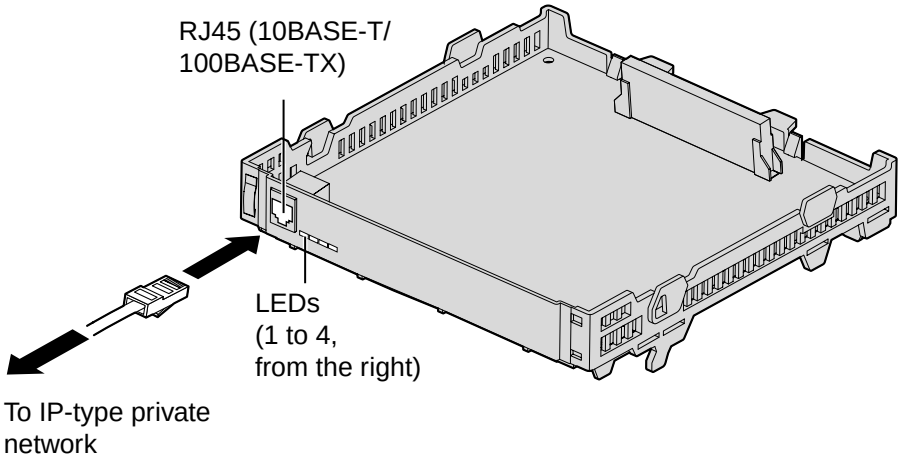
The maximum distance of the extension cable that connects the Hybrid IP-PBX and the ISDN terminal equipment (TE) is shown below:



2.3.4 IP-GW4 Card

Function

4-channel VoIP gateway card. VoIP H.323 V.2, ITU-T G.729a, G.723.1 and G.711 compliant.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, Strap × 1

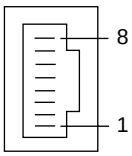
User-supplied (not included): RJ45 connector

Notes

- Maximum length of the Ethernet (10BASE-T/100BASE-TX) cable to be connected to this optional service card is 100 m.
- For programming instructions and other information of the IP-GW4 card, refer to the manual for the IP-GW4 card.
- To confirm the trunk connection, refer to "Confirming the Trunk Connection" in "2.12.1 Starting the Hybrid IP-PBX".

Pin Assignments

RJ45 Connector (10BASE-T/100BASE-TX)



No.	Signal Name	Input (I)/Output (O)	Function
1	TPO+	O	Transmit data+
2	TPO-	O	Transmit data-
3	TPI+	I	Receive data+
4-5	Reserved	–	–
6	TPI-	I	Receive data-
7-8	Reserved	–	–

LED Indications

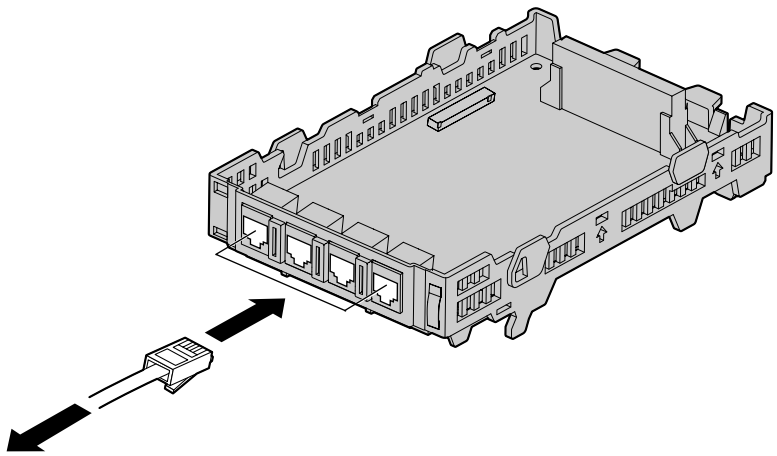
	Colour	Description
1	Green	On-line status indication • OFF: On-line mode • Flash: Emergency maintenance mode
2	Red	Alarm detection status indication • ON: Alarm • OFF: Normal
3	Green	Link status indication • ON: Normal Connection • OFF: Connection Error
4	Green	Data transmission status indication • ON: Data transmitting • OFF: No data transmitted

2.4 Installation of the Extension Cards

2.4.1 DLC4 Card

Function

4-port digital extension card for DPTs, DSS consoles, DPT Interface CSs, and VM.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ45 connector/RJ11 connector

Notice

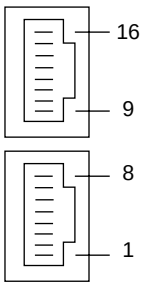
The connector type may be RJ45 or RJ11 depending on the country/area.

Shown above is a card having the RJ45 connectors.

Note

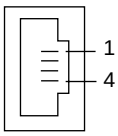
For details about connecting the CS, refer to "2.8.7 Connecting the Cell Station to the Hybrid IP-PBX".

RJ45 Connector Pin Assignments



No.	Signal Name	Function
1/9	Reserved	–
2/10	Reserved	–
3/11	D2	Data port (Low Volt)
4/12	Reserved	–
5/13	Reserved	–
6/14	D1	Data port (High Volt)
7/15	Reserved	–
8/16	Reserved	–

RJ11 Connector Pin Assignments

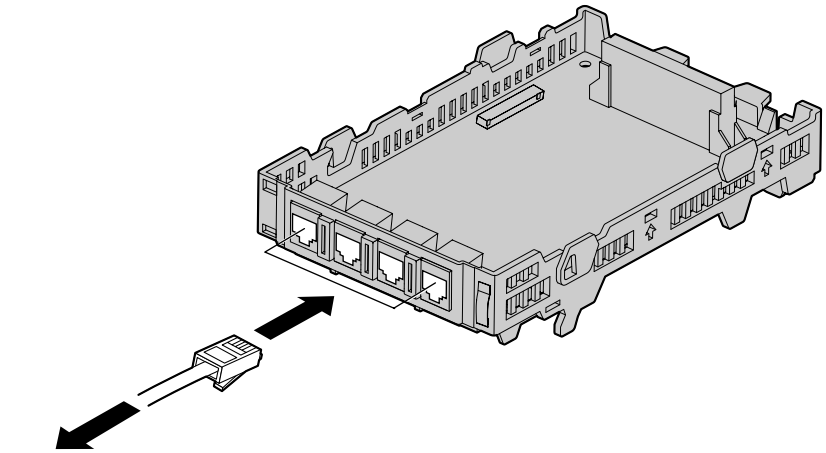


No.	Signal Name	Function
1	D1	Data port (High Volt)
2	Reserved	–
3	Reserved	–
4	D2	Data port (Low Volt)

2.4.2 SLC4 Card

Function

4-port extension card for SLTs.



To extension

Accessory and User-supplied Items

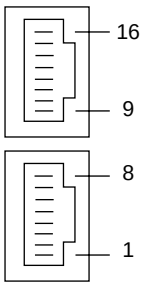
Accessory (included): Extension Bolt × 1, Strap× 1

User-supplied (not included): RJ45 connector/RJ11 connector

Notice

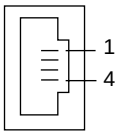
The connector type may be RJ45 or RJ11 depending on the country/area. Shown above is a card having the RJ45 connectors.

RJ45 Connector Pin Assignments



No.	Signal Name	Function
1/9	Reserved	–
2/10	Reserved	–
3/11	Reserved	–
4/12	R	Ring
5/13	T	Tip
6/14	Reserved	–
7/15	Reserved	–
8/16	Reserved	–

RJ11 Connector Pin Assignments

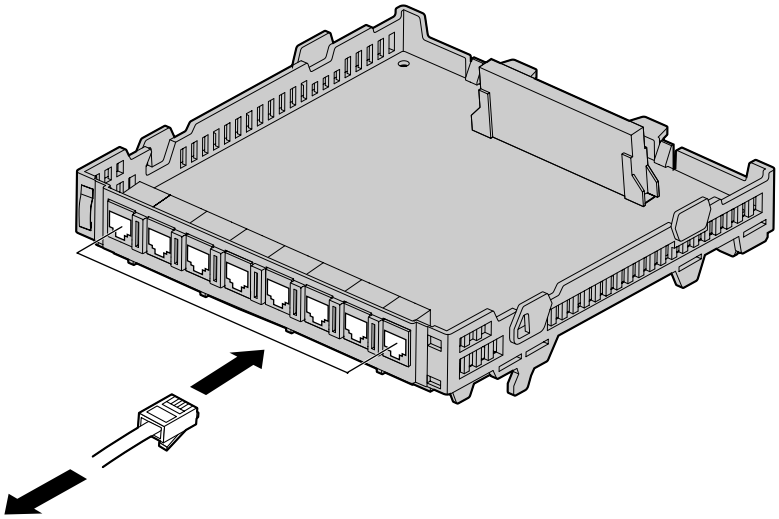


No.	Signal Name	Function
1	Reserved	–
2	T	Tip
3	R	Ring
4	Reserved	–

2.4.3 DLC8 Card

Function

8-port digital extension card for DPTs, DSS consoles, DPT Interface CSs, and VM.



To extensions

Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, Strap × 1

User-supplied (not included): RJ11 connector

Notice

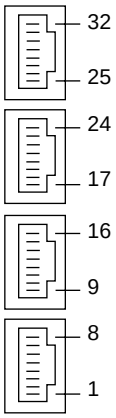
The connector type may be RJ45 or RJ11 depending on the country/area.

Shown above is a card having the RJ45 connectors.

Note

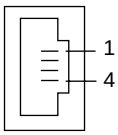
For details about connecting the CS, refer to "2.8.7 Connecting the Cell Station to the Hybrid IP-PBX".

RJ45 Connector Pin Assignments



No.	Signal Name	Function
1/9/17/25	Reserved	–
2/10/18/26	Reserved	–
3/11/19/27	D2	Data port (Low Volt)
4/12/20/28	Reserved	–
5/13/21/29	Reserved	–
6/14/22/30	D1	Data port (High Volt)
7/15/23/31	Reserved	–
8/16/24/32	Reserved	–

RJ11 Connector Pin Assignments

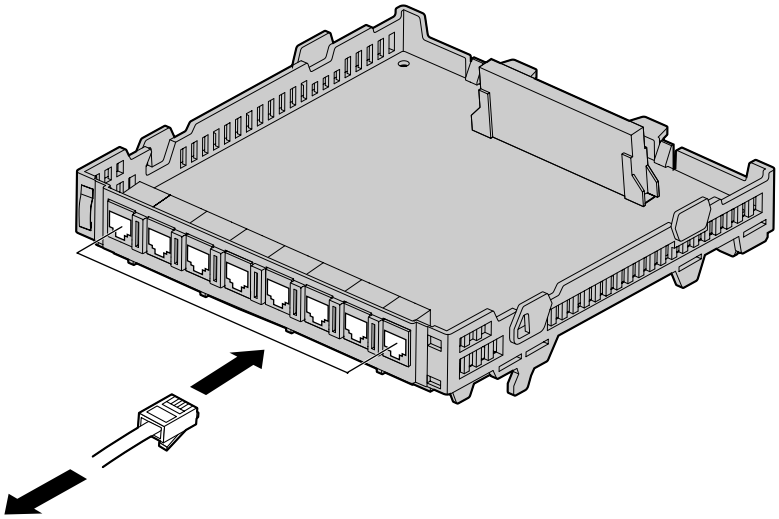


No.	Signal Name	Function
1	D1	Data port (High Volt)
2	Reserved	–
3	Reserved	–
4	D2	Data port (Low Volt)

2.4.4 SLC8 Card

Function

8-port extension card for SLTs.



To extensions

Accessory and User-supplied Items

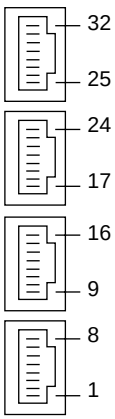
Accessory (included): Extension Bolt ×1, Strap × 1

User-supplied (not included): RJ45 connector/RJ11 connector

Notice

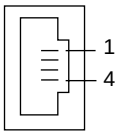
The connector type may be RJ45 or RJ11 depending on the country/area.
Shown above is a card having the RJ45 connectors.

RJ45 Connector Pin Assignments



No.	Signal Name	Function
1/9/17/25	Reserved	–
2/10/18/26	Reserved	–
3/11/19/27	Reserved	–
4/12/20/28	R	Ring
5/13/21/29	T	Tip
6/14/22/30	Reserved	–
7/15/23/31	Reserved	–
8/16/24/32	Reserved	–

RJ11 Connector Pin Assignments



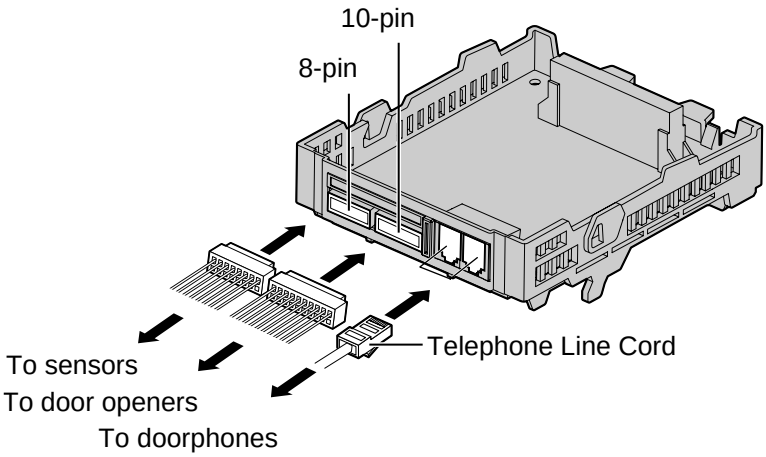
No.	Signal Name	Function
1	Reserved	–
2	T	Tip
3	R	Ring
4	Reserved	–

2.5 Installation of the Other Cards

2.5.1 DPH4 Card

Function

4-port doorphone card for 4 doorphones, 4 door openers (relays) and 4 sensors.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, 10-pin terminal block × 1, 8-pin terminal block × 1, Telephone Line Cord × 2, Terminal Box × 1 (for DPH4 card with RJ45 connectors) or 2 (for DPH4 card with RJ11 connectors) , Strap × 1

User-supplied (not included): none

Notice

The connector type may be RJ45 or RJ11 depending on the country/area.

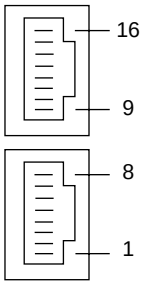
Shown above is a card having the RJ45 connectors. As compared to the RJ45 connectors, the RJ11 connectors are upside down in position.

Note

For details about connection to doorphones and door openers, refer to "2.9.1 Connection of Doorphones and Door Openers".

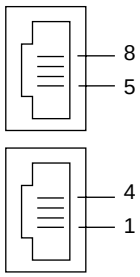
Pin Assignments

RJ45 Connector



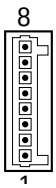
No.	Signal Name	Function
1-2	Reserved	–
3	DP2	Doorphone 2 transmit
4	DP1	Doorphone 1 transmit
5	com1	Doorphone 1 receive
6	com2	Doorphone 2 receive
7-10	Reserved	–
11	DP4	Doorphone 4 transmit
12	DP3	Doorphone 3 transmit
13	com3	Doorphone 3 receive
14	com4	Doorphone 4 receive
15-16	Reserved	–

RJ11 Connector



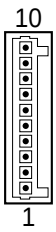
No.	Signal Name	Function
1	DP2	Doorphone 2 transmit
2	DP1	Doorphone 1 transmit
3	com1	Doorphone 1 receive
4	com2	Doorphone 2 receive
5	DP4	Doorphone 4 transmit
6	DP3	Doorphone 3 transmit
7	com3	Doorphone 3 receive
8	com4	Doorphone 4 receive

8-pin Terminal Block



No.	Signal Name	Function
1	SENS 1a	Sensor 1a
2	SENS 1b	Sensor 1b
3	SENS 2a	Sensor 2a
4	SENS 2b	Sensor 2b
5	SENS 3a	Sensor 3a
6	SENS 3b	Sensor 3b
7	SENS 4a	Sensor 4a
8	SENS 4b	Sensor 4b

10-pin Terminal Block

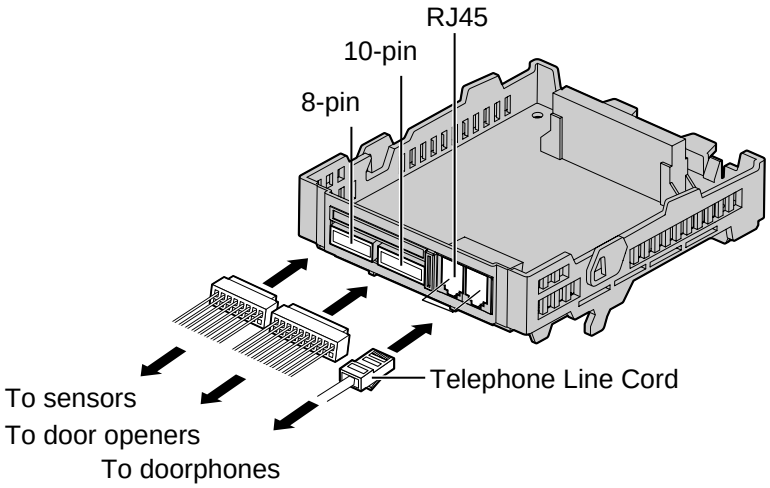


No.	Signal Name	Function
1	OP1b (RL 1b)	Door opener 1 (Relay 1)
2	OP1a (RL 1a)	Door opener 1 com (Relay 1 com)
3	OP2b (RL 2b)	Door opener 2 (Relay 2)
4	OP2a (RL 2a)	Door opener 2 com (Relay 2 com)
5	OP3b (RL 3b)	Door opener 3 (Relay 3)
6	OP3a (RL 3a)	Door opener 3 com (Relay 3 com)
7	OP4b (RL 4b)	Door opener 4 (Relay 4)
8	OP4a (RL 4a)	Door opener 4 com (Relay 4 com)
9-10	Reserved	–

2.5.2 DPH2 Card

Function

2-port doorphone card for 2 doorphones, 2 door openers, 4 relays, and 4 sensors.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1, 10-pin terminal block × 1, 8-pin terminal block × 1
Telephone Line Cord × 2, Terminal Box × 1, Strap × 1

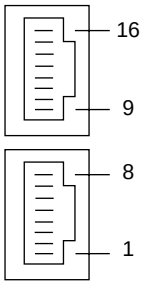
User-supplied (not included): none

Note

For details about connection to doorphones and door openers, refer to "2.9.1 Connection of Doorphones and Door Openers".

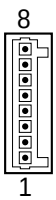
Pin Assignments

RJ45 Connector



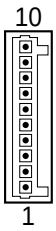
No.	Signal Name	Function
1	OP1b	Door opener 1
2	OP1a	Door opener 1 com
3	Path_1b	Doorphone 1 transmit
4	Path_1a	Doorphone 1 receive
5	Call_1b	Doorphone 1 call button
6	Call_1a	Doorphone 1 call button com
7	DC1b	Doorphone control 1
8	DC1a	Doorphone control 1 com
9	OP2b	Door opener 2
10	OP2a	Door opener 2 com
11	Path_2b	Doorphone 2 transmit
12	Path_2a	Doorphone 2 receive
13	Call_2b	Doorphone 2 call button
14	Call_2a	Doorphone 2 call button com
15	DC2b	Doorphone control 2
16	DC2a	Doorphone control 2 com

8-pin Terminal Block



No.	Signal Name	Function
1	SENS 1a	Sensor 1a
2	SENS 1b	Sensor 1b
3	SENS 2a	Sensor 2a
4	SENS 2b	Sensor 2b
5	SENS 3a	Sensor 3a
6	SENS 3b	Sensor 3b
7	SENS 4a	Sensor 4a
8	SENS 4b	Sensor 4b

10-pin Terminal Block

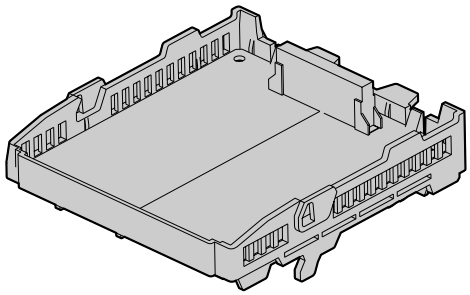


No.	Signal Name	Function
1	RL1b	Relay 1
2	RL1a	Relay 1 com
3	RL2b	Relay 2
4	RL2a	Relay 2 com
5	RL3b	Relay 3
6	RL3a	Relay 3 com
7	RL4b	Relay 4
8	RL4a	Relay 4 com
9-10	Reserved	–

2.5.3 ECHO8 Card

Function

8-channel card for echo cancellation in the Conference Mode.



Accessory and User-supplied Items

Accessory (included): Extension Bolt × 1

User-supplied (not included): none

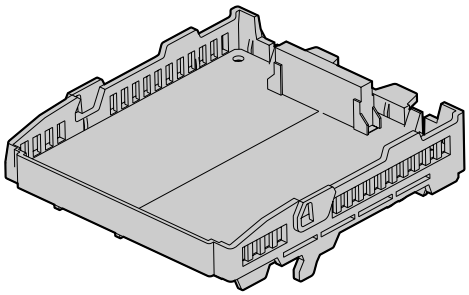
Notes

- One Hybrid IP-PBX supports a maximum of 16 simultaneous calls that are engaged in conference calls (e.g., 2 eight-party conferences, 4 three-party conferences + 1 four-party conferences, 5 three-party conferences).
- To establish a conference call involving 6 to 8 parties, install an ECHO8 card and enable the echo cancellation for conference using the KX-TDA Maintenance Console (refer to "3.3.3 Hybrid IP-PBX Configuration").

2.5.4 MSG2 Card

Function

2-channel message card.



Accessory and User-supplied Items

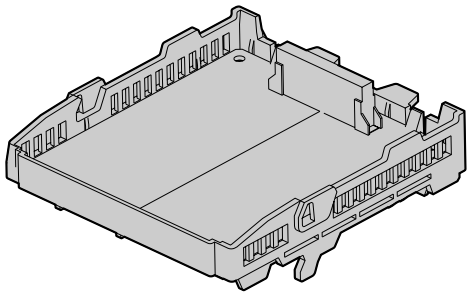
Accessory (included): Extension Bolt × 1

User-supplied (not included): none

2.5.5 EXT-CID Card

Function

Sends Caller ID signal for extension ports. To be installed in the Option Slot.



Accessory and User-supplied Items

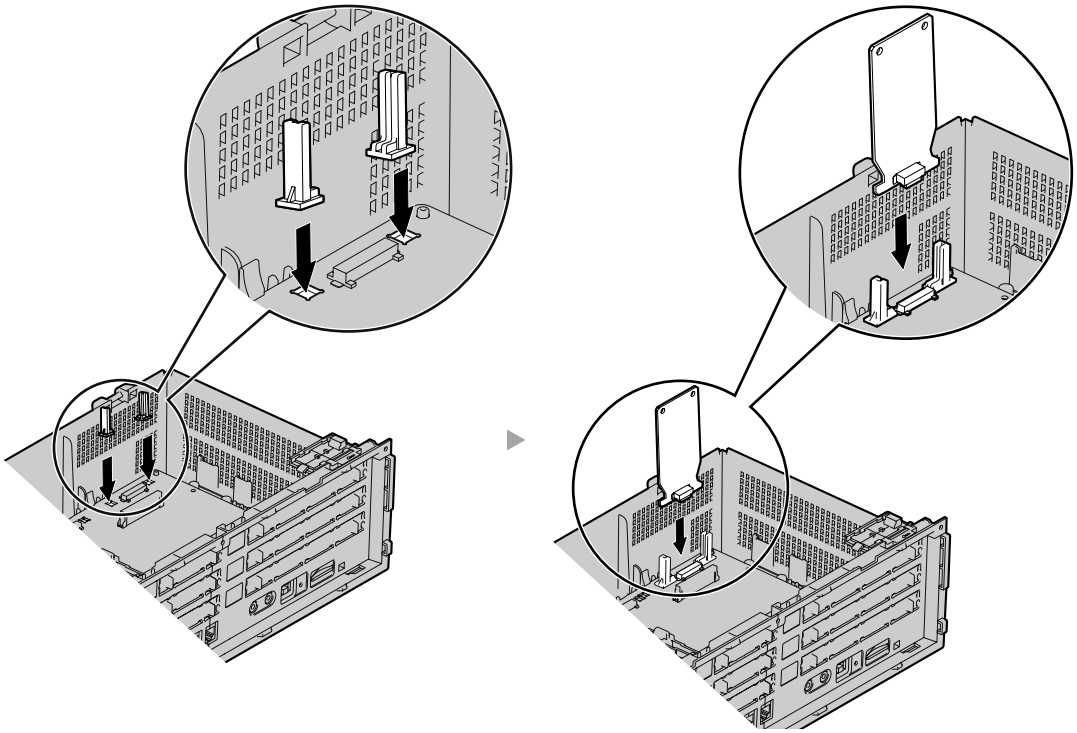
Accessory: Extension Bolt × 1

User-supplied: none

2.5.6 RMT Card

Function

Analogue modem card for remote communication with the Hybrid IP-PBX. V90 support. To be installed in the RMT Slot.



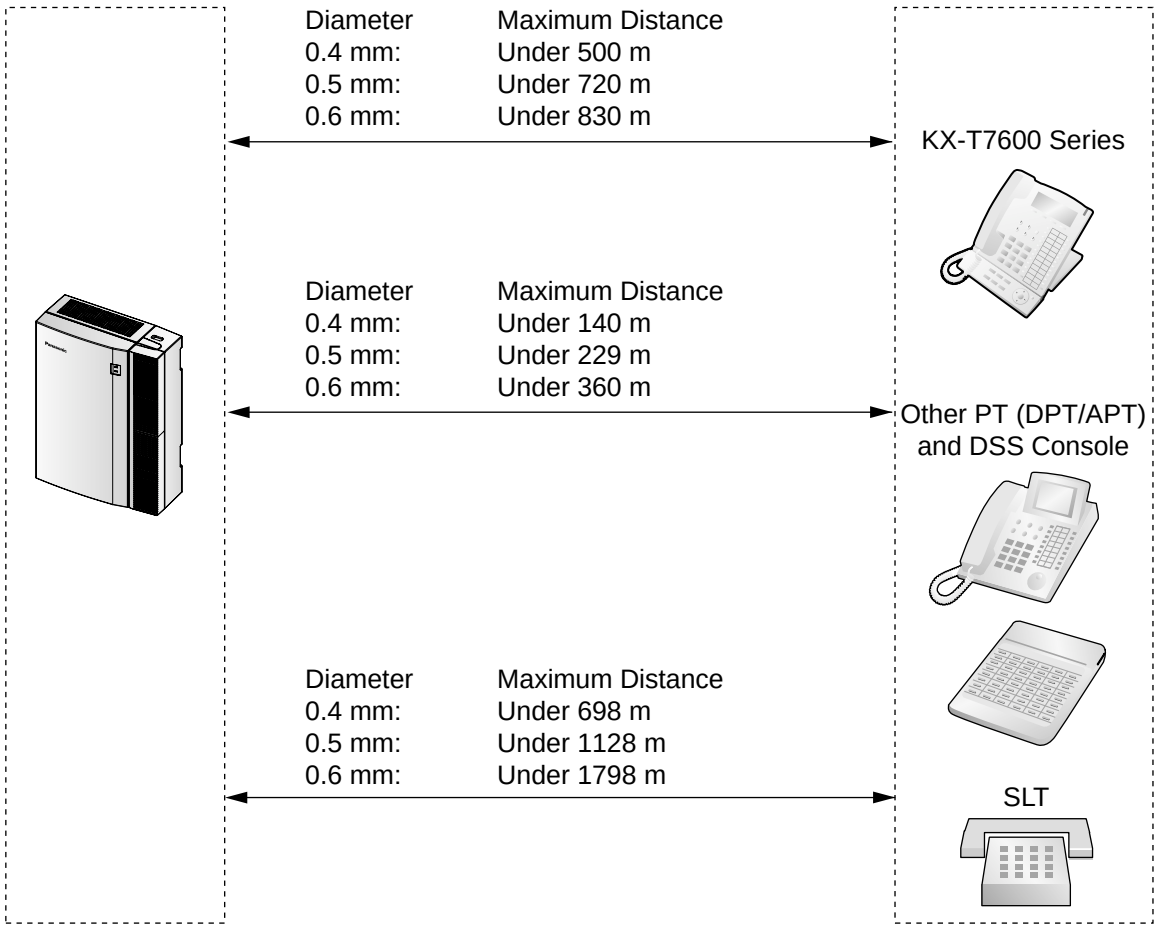
Accessory and User-supplied Items

Accessory (included): Guide Rail × 2

User-supplied (not included): none

2.6 Connection of Extensions

2.6.1 Maximum Cabling Distance of the Extension Wiring (Twisted Cable)



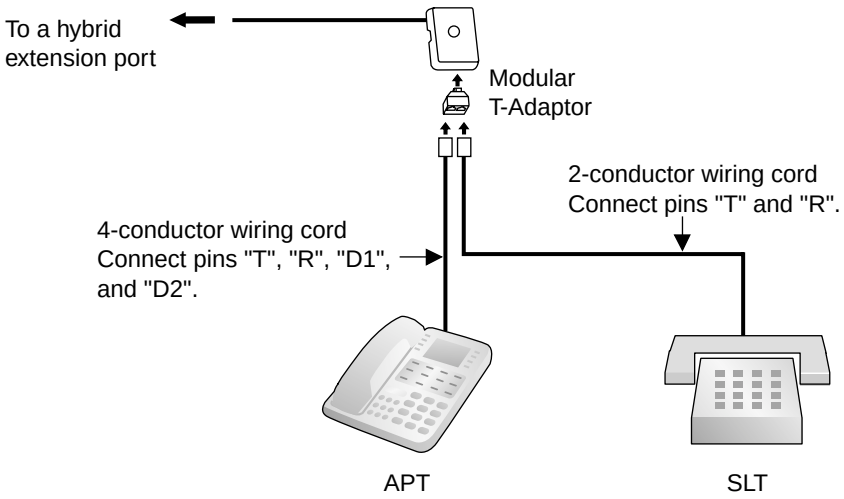
	DPT Interface CS	DPT	APT	Console	SLT
Hybrid Extension Ports (Main Unit)	✔	✔	✔	✔	✔
SLC4, SLC8 Cards					✔
DLC4, DLC8 Cards	✔	✔		✔	

"✔" indicates that the extension card is available for the terminal.

2.6.2 Parallel Connection of the Extensions

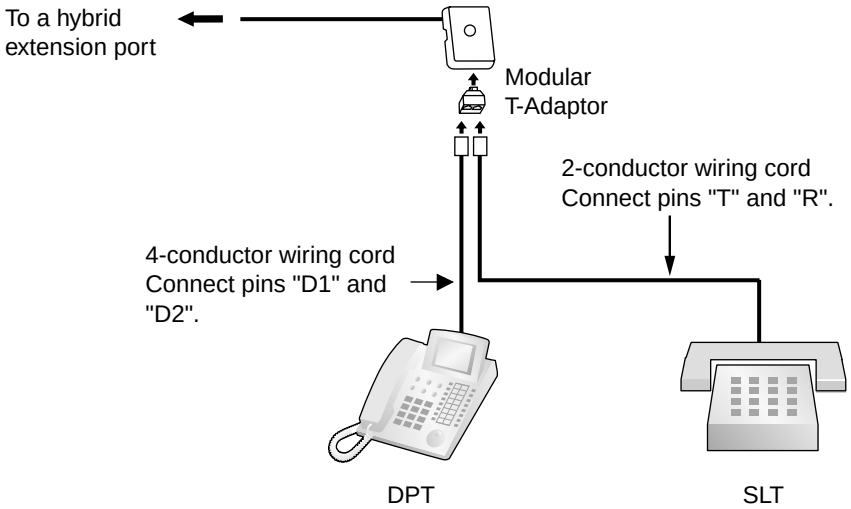
With APT

Any SLT can be connected in parallel with an APT as follows:



With DPT

Any SLT can be connected in parallel with a DPT as follows:



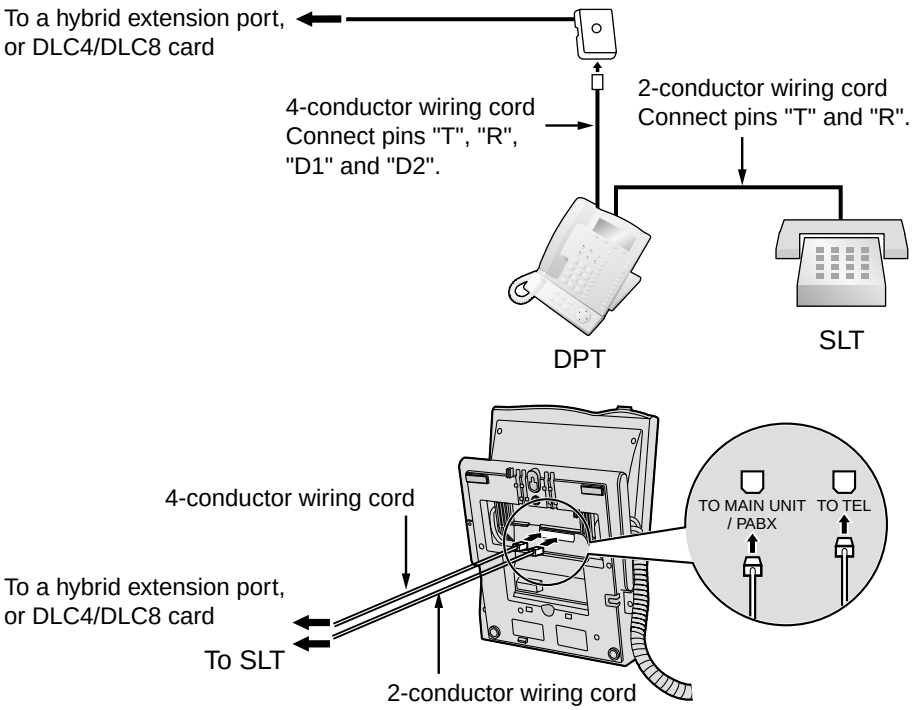
Notes

- In addition to an SLT, an answering machine, a fax machine or a modem (PC) can be connected in parallel with APTs and DPTs.
- If the eXtra Device Port (XDP) mode is enabled through system programming, parallel connection is not possible. Refer to "1.10.9 Parallelled Telephone" and "2.1.1 Extension Port Configuration" in the Feature Guide for further information.

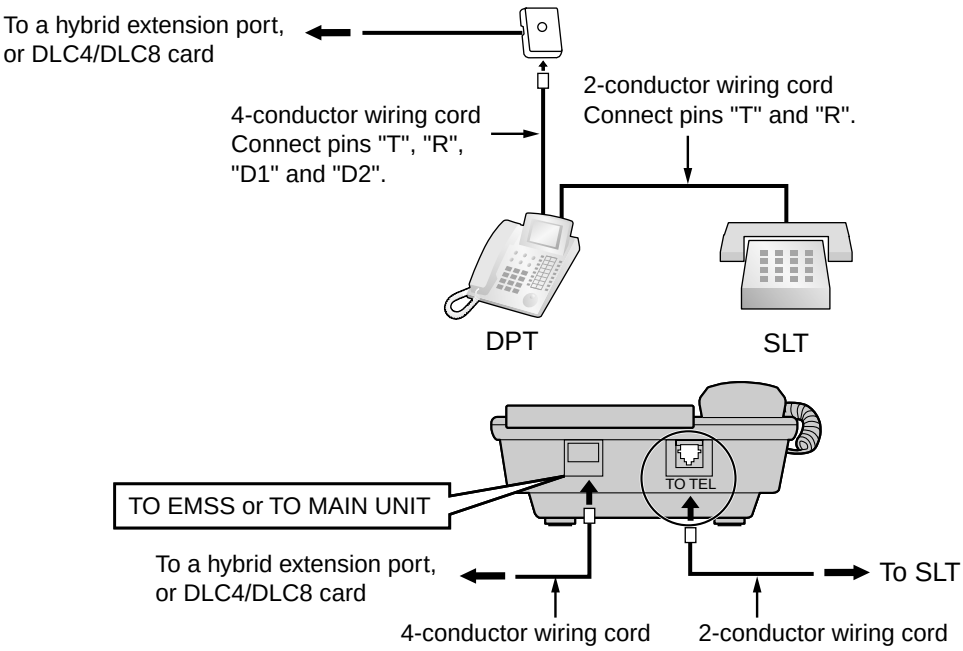
2.6.3 Extra Device Port (XDP) Connection

Any SLT can be connected in parallel with DPT (except KX-T7560 and KX-T7565) as follows:

With KX-T7600 Series DPT



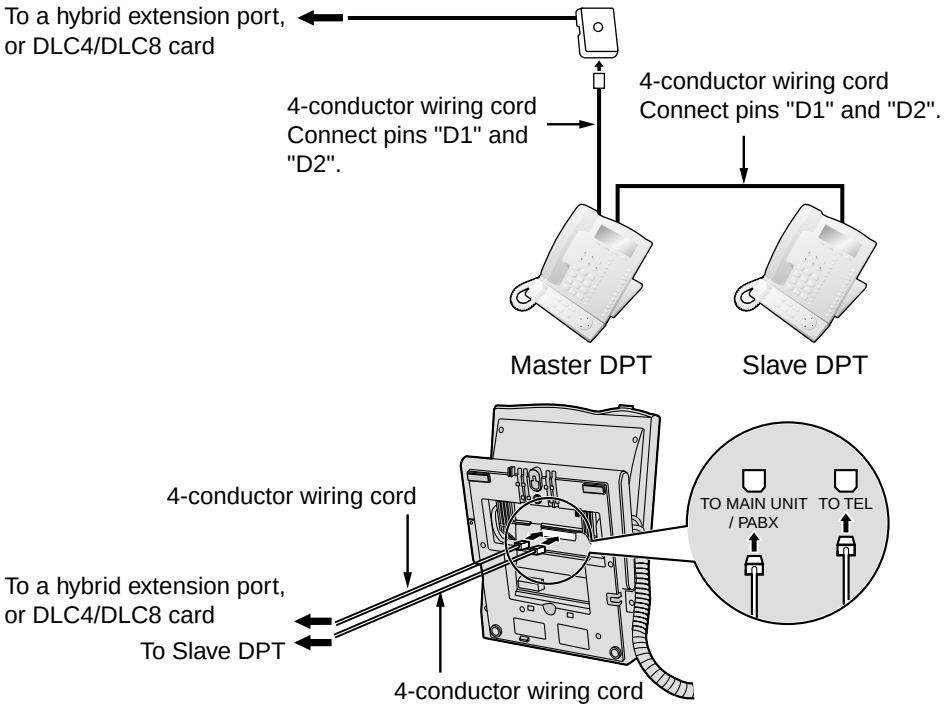
With Other DPTs (except KX-T7560 and KX-T7565)



2.6.4 Digital Extra Device Port (Digital XDP) Connection

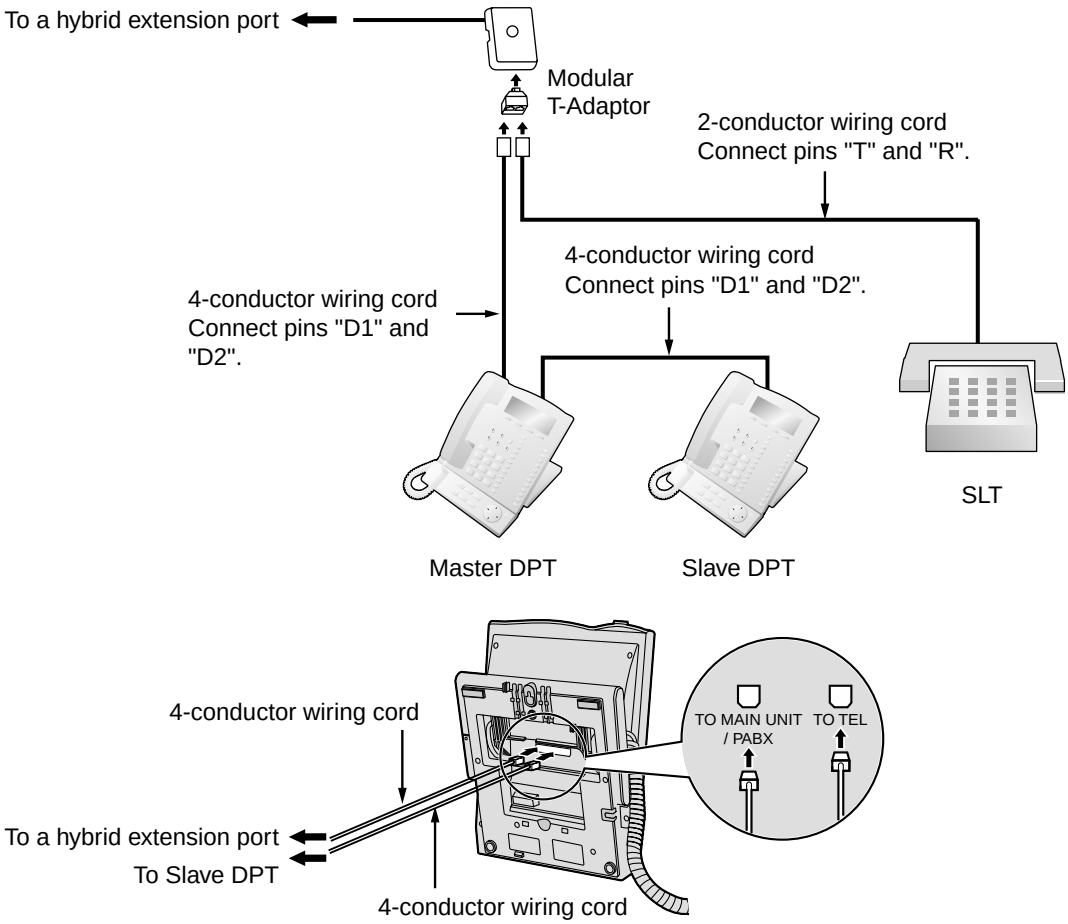
Connection between two KX-T7600 Series DPTs (except KX-T7640)

Two KX-T7600 series DPT can be connected in parallel as follows:



Connection between KX-T7600 Series DPT (except KX-T7640) and SLT

In addition to a KX-T7600 series DPT connected in parallel, an SLT can also be connected to KX-T7600 series DPT as follows:



Note

USB Modules must not be connected to DPTs in Digital XDP connection. If a PC is connected to a master DPT via a USB Module, the PC cannot be used for the PC Phone, PC Console, or CTI features. Also, if a USB module is connected to a slave DPT, the DPT cannot work properly.

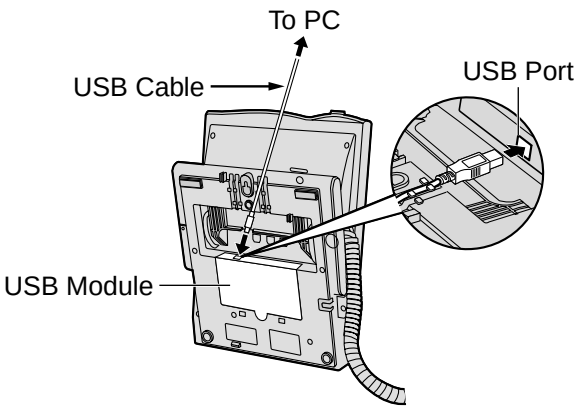
2.6.5 First Party Call Control CTI Connection

CTI connection between a PC and a KX-T7633/T7636 DPT provides the first party call control. The CTI connection is made via USB interface (version 1.1), and uses the CSTA Phase 3 protocol.

A USB Module (KX-T7601) must be connected to the KX-T7633/T7636 DPT.

Note

The operating system of the PC required for first party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.



Note

Maximum length of the USB cable is 3 m.

2.7 Connection of DECT Portable Stations

2.7.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0141CE)

This unit determines the area covered by the wireless system. Up to 2 calls can be made at the same time through each CS.

Note for users in Europe

This Cell Station Unit for DECT is for connection to a Panasonic PBX of a European country.

PS: DECT Portable Station (KX-TD7590/KX-TD7580)

The KX-TDA30 can support up to 28 PSs. For more details about the PS, please refer to the PS Operating Instructions.

RF Specification

Item	Description
Radio Access Method	Multi Carrier TDMA-TDD
Frequency Band	1880 MHz to 1900 MHz*1
Number of Carriers	10*2
Carrier Spacing	1728 kHz
Bit Rate	1152 kbps
Carrier Multiplex	TDMA, 24 (Tx12, Rx12) slots per frame
Frame Length	10 ms
Modulation Scheme	GFSK
	Roll-off factor=0.5 50 % roll-off in the transmitter
Data Coding for Modulator	Differential Coding
Voice CODEC	32 kbps ADPCM (CCITT G.721)
Transmission Output	Average 10 mW Peak 250 mW

*1 The number may vary depending on the country/area. In Taiwan, it is 1880 MHz to 1895 MHz.
*2 The number may vary depending on the country/area. In Taiwan, it is 8.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high voltage equipment.

- The CS should not be placed on a metal object.
- Do not use this wireless system near another high power cordless system such as DECT or SS wireless.
- Keep distance between the equipment listed below in order to prevent noise, interference or the disconnection of a conversation. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc., or microwaves	More than 2 m
CS and PS	More than 1 m
Each PS	More than 0.5 m
Hybrid IP-PBX and CS	More than 2 m

Too many CSs in a small area can cause problems due to conflicts over which signal channels each CS can use. Ideally, CSs should be a minimum of 25 m to 40 m apart. However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.

2.7.2 Procedure Overview

When connecting the wireless system, use extreme care to conduct a site survey. Site survey can be conducted using the KX-TD7590 PS. Inadvertent site survey can result in narrow service area, frequent noise, and disconnection of calls.

1. Investigate the installation site

Refer to "2.7.3 Site Planning".

a. Obtain the map of the CS installation site.

b. Consider the service area demanded by the user on the map.

c. Plan the locations of each CS, taking account of distance, building materials and etc.

2. Prepare for site survey

Refer to "2.7.4 Before Site Survey".

a. Check and assign the CS ID number to the PS.

b. Assign a channel number to each CS by setting the DIP switches on the back of the CS.

c. Supply electricity to each CS using an AC adaptor or a battery box.

d. Install each CS temporarily as planned.

Notes

- Install at least 2 m above the floor.
- Keep the antennas in the upright positions.

3. Conduct the site survey

Refer to "2.7.5 Site Survey Using the KX-TD7590".

a. Test the radio signal strength using the PS.
Confirm that the radio signal strength level is "12" near the CS.

b. By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.

c. Map the CS coverage area at radio signal strength levels "3" and "8".

d. Make sure that adjacent CS coverage areas overlap where the radio signal strength level is "8" by at least 5 m.

e. Make sure that the radio signal strength level is greater than "3" at any location within the service area demanded by the user.

4. Finish the site survey

Refer to "2.7.6 After Site Survey".

a. Return all DIP switches of each CS to the OFF position, and stop supplying electricity.

b. Turn off the PS.

5. Connect the CS and PS to the Hybrid IP-PBX and test the operation

Refer to "2.7.7 Connecting the Cell Station to the Hybrid IP-PBX".

a. Connect the CSs to the Hybrid IP-PBX.

b. Register the PSs to the Hybrid IP-PBX.

c. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install additional CS.

6. Mount the CS on the wall

Refer to "2.7.8 Wall Mounting".

a. If everything assuredly goes as planned, mount the CS on the wall.

2.7.3 Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

Understanding the Radio Waves

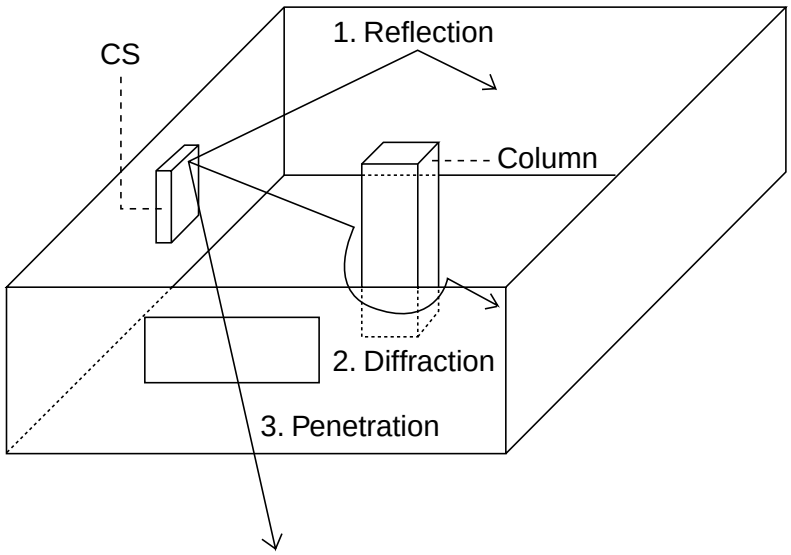
Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects such as those made of metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects such as those made of glass.



Relationships Between Radio Waves and Building Structure and Materials

- The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

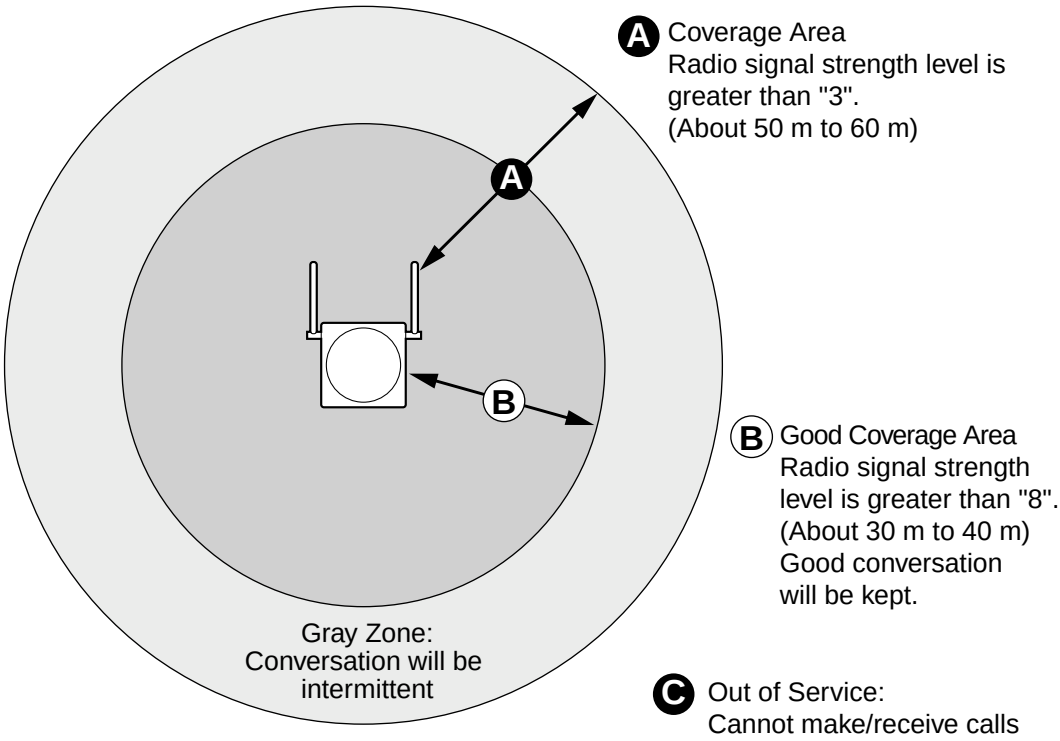
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heat-resistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed where there is no obstacle.

Note

Radio signal strength levels are measured during the site survey (refer to "2.7.5 Site Survey Using the KX-TD7590").


A Coverage Area
Radio signal strength level is greater than "3".
(About 50 m to 60 m)
A
B
B Good Coverage Area
Radio signal strength level is greater than "8".
(About 30 m to 40 m)
Good conversation will be kept.
Gray Zone:
Conversation will be intermittent
C Out of Service:
Cannot make/receive calls

Radio Signal Strength Levels

Level: 00	Out of range
Level: 01 to 02	Catches noise easily or disconnects
Level: 03 to 07	May catch noise
Level: 08 to 10	Good
Level: 11 to 12	Better

Site Survey Preparation

1. Obtain the map and investigate the installation site.
   - **a.** Check the obstacles (e.g., shelves, columns, and partitions).
   - **b.** Check the materials of the structures (e.g., metal, concrete, and plywood).
   - **c.** Check the layout and dimensions of the room, corridor, etc.
   - **d.** Write down the above information to the map.
2. Examine the service area demanded by the user on the map, referring to the following example.
   - **a.** Draw the coverage area around a CS. Extend the coverage area to 30 m to 60 m in one direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.

b. If 1 CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.
Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.

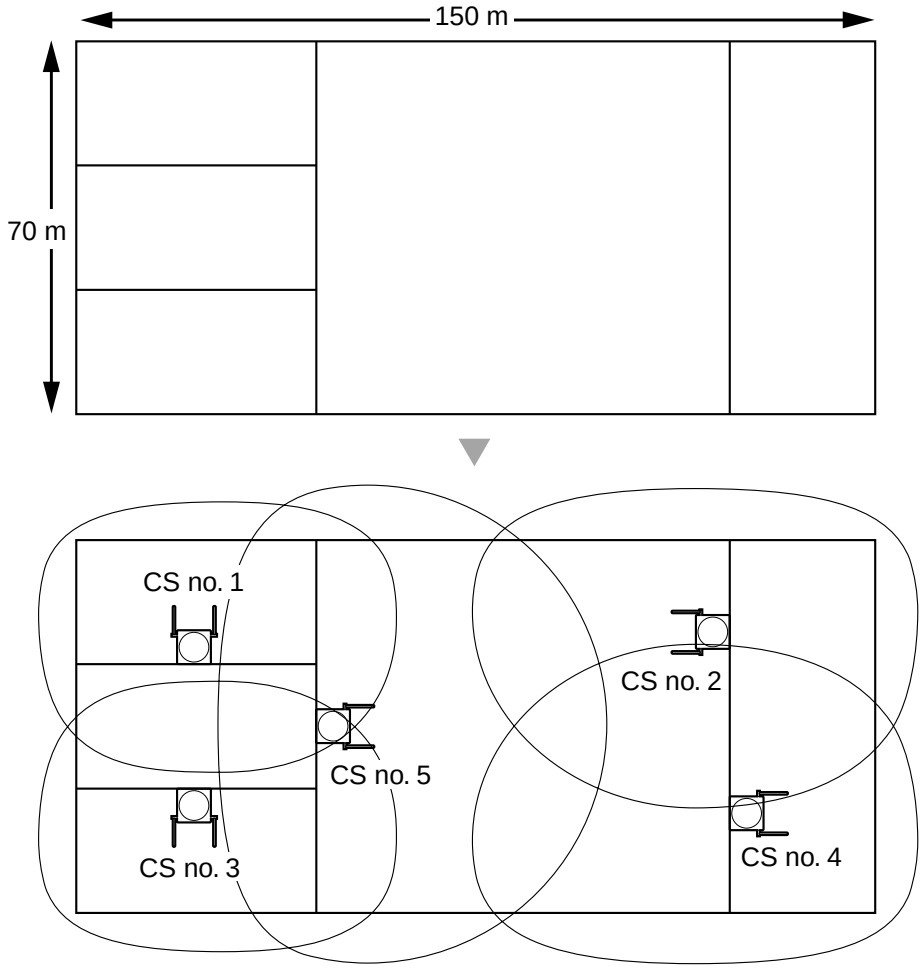
Example: Installing in a Room Separated by Walls

Things to take note of:

- The room is separated by walls.
- The room is surrounded by concrete walls.

CS installation plan:

- The coverage area of each CS will not extend as much it does where there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



2.7.4 Before Site Survey

Use the KX-TD7590 PS to conduct the site survey.

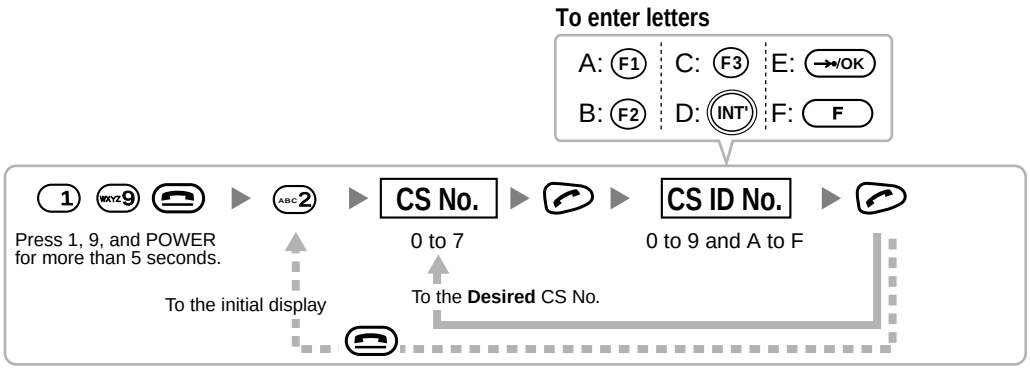
Note

The display language for the site survey is available only in English.

Checking the CS ID Number

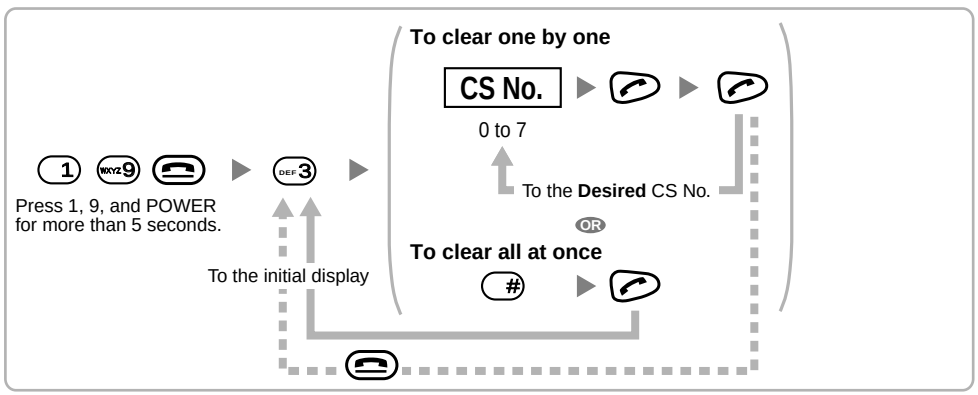
Check the CS ID number using the KX-TDA Maintenance Console (refer to "3.3.4 Hybrid IP-PBX Maintenance").

Assigning the CS ID Number to the PS



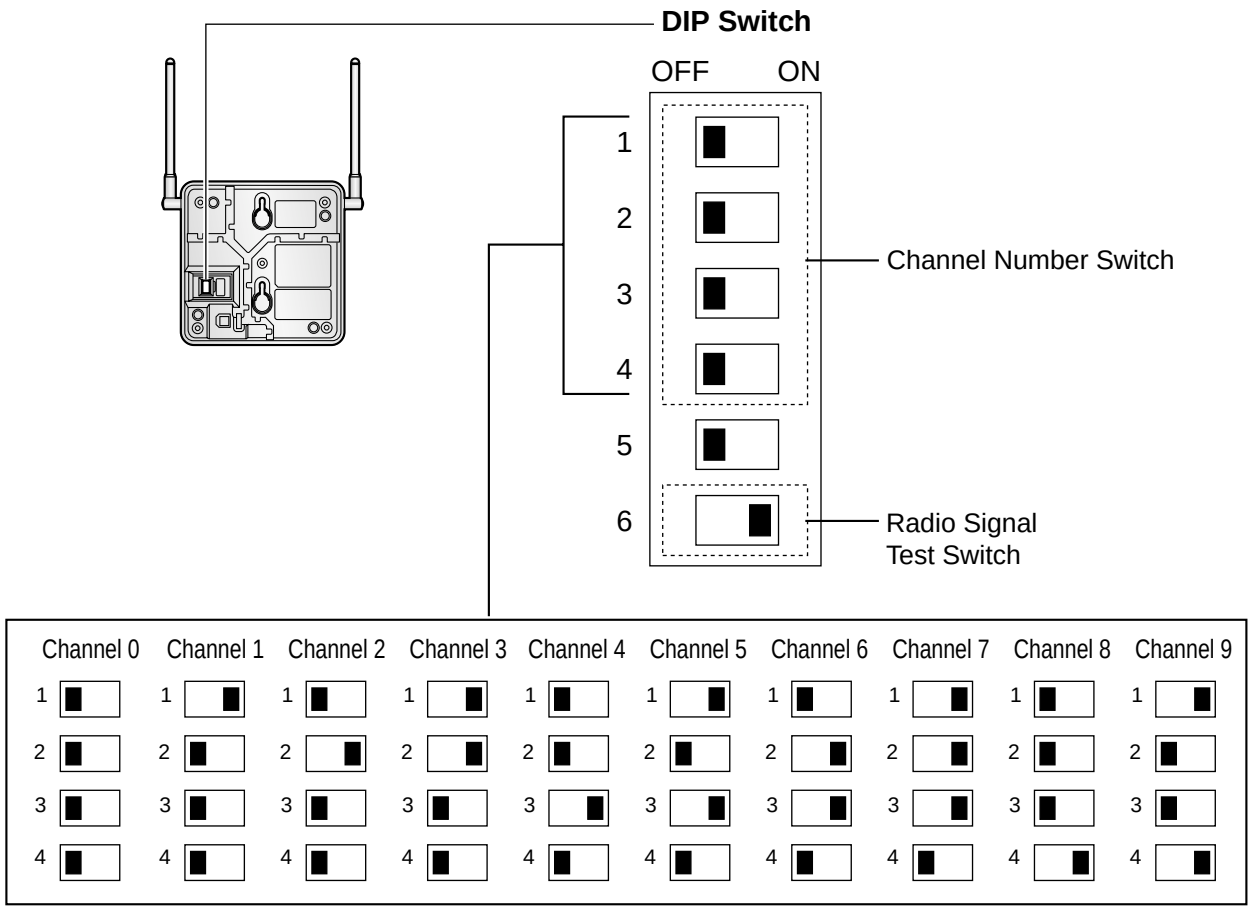
Note

To clear the CS ID number assigned to the PS, follow the procedure below:



Setting and Installing the CS Temporarily for Site Survey

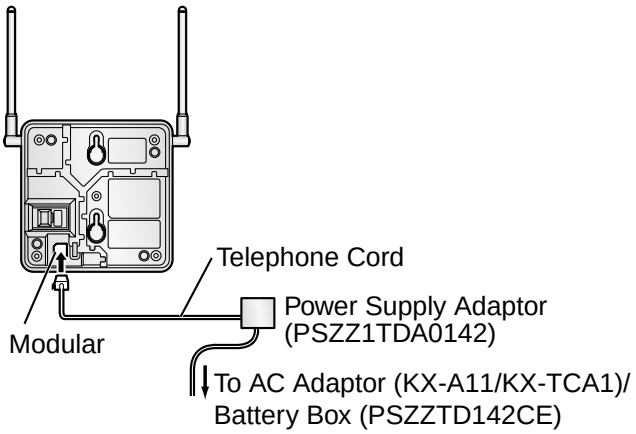
1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the channel number switches as desired.



Notes

- To see the radio signal strength of more than 1 CS, a channel number must be set for each CS.
- If more than 1 CS is in Radio Signal Test mode, each CS must have a unique channel number.

3. After setting the DIP switch, connect an AC adaptor or battery box to the CS using a power supply adaptor.



4. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, keeping the antennas in the upright positions.

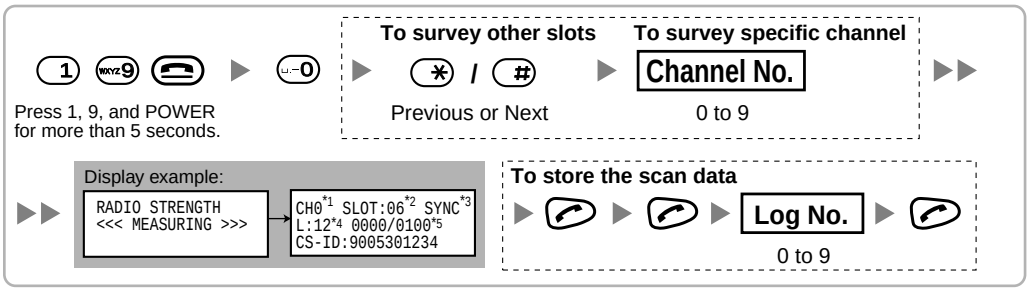
2.7.5 Site Survey Using the KX-TD7590

The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS for site survey. In the Radio Signal Test mode, the frame loss and signal strength of a synchronous slot, and the signal strength of the other slots can be measured when the PS is monitoring the CS. After installing the CSs temporarily as planned during site planning, set the PS to the Radio Signal Test mode and locate each CS to measure its coverage area. Then, record the results on the map of the installation site.

Testing the Radio Signal Strength

After locating the CS(s) temporarily, execute the Radio Signal Test using the PS. The PS scans whether there is a CS that can link with on channel 0 right after entering the Radio Signal Test mode. The channel to be scanned can be changed by pressing the appropriate 0 through 9 keys.

1. Enter the Radio Signal Test mode.



Notes

*1: Channel number

*2: Slot number

*3: When a slot is synchronised, "SYNC" is displayed.

*4: Radio signal strength level

*5: Frame error (0000 to 9999)/Frame counter (0000 to 9999). Frame error indicates the number of errors out of 10 000 radio signal receptions. Increased number of frame errors indicates greater radio signal interference and more frequent noise during conversation. The ideal number of frame error is "0000".

CAUTION

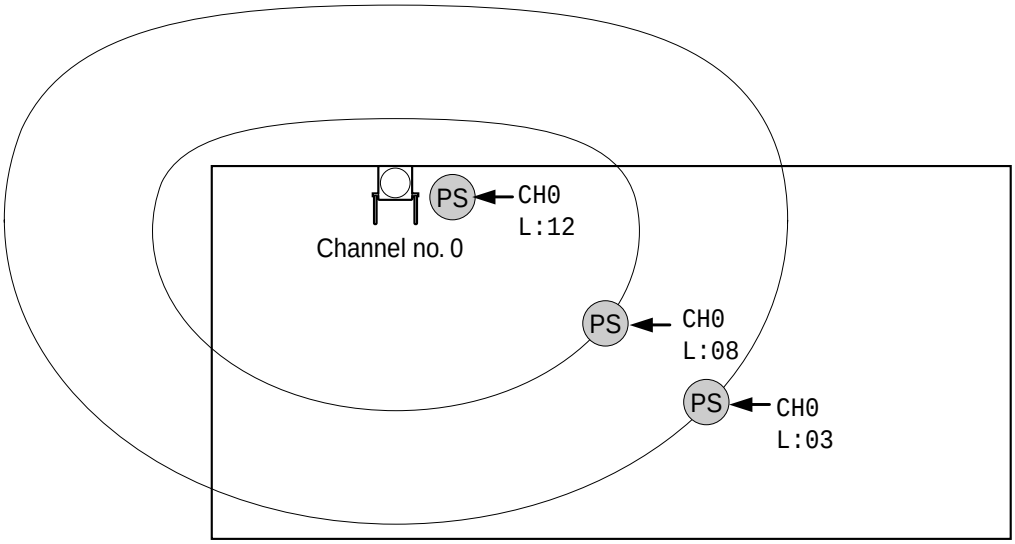
Storing the scan data will clear all directory data.

2. Measure the radio signal strength by moving to and away from the CS.

a. Move to the CS until the point the radio signal strength level becomes "12".

b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.

c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.

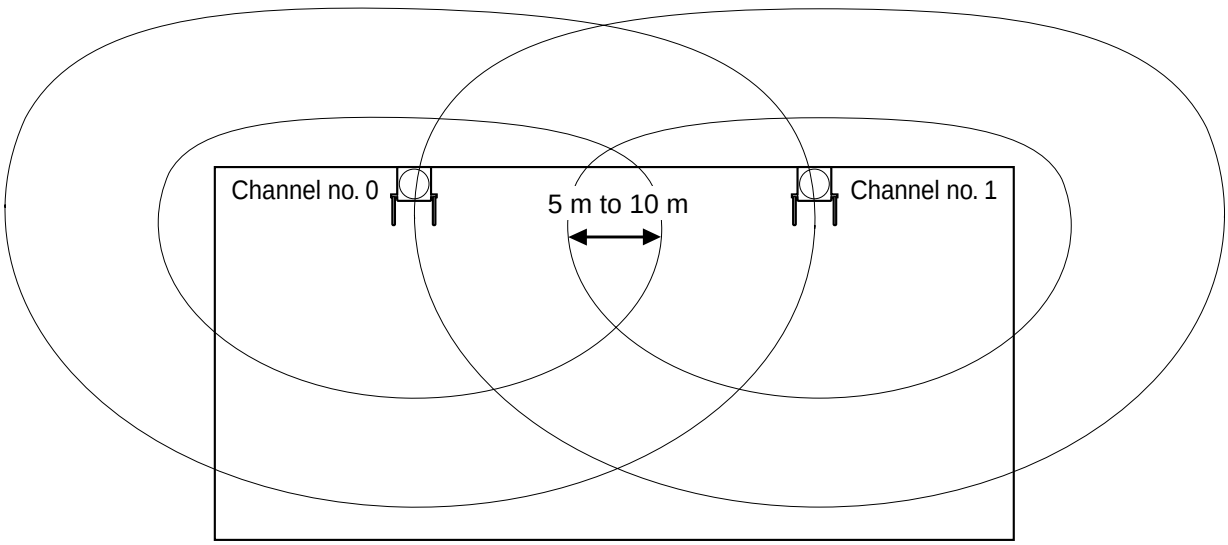


Radio Signal Strength Levels

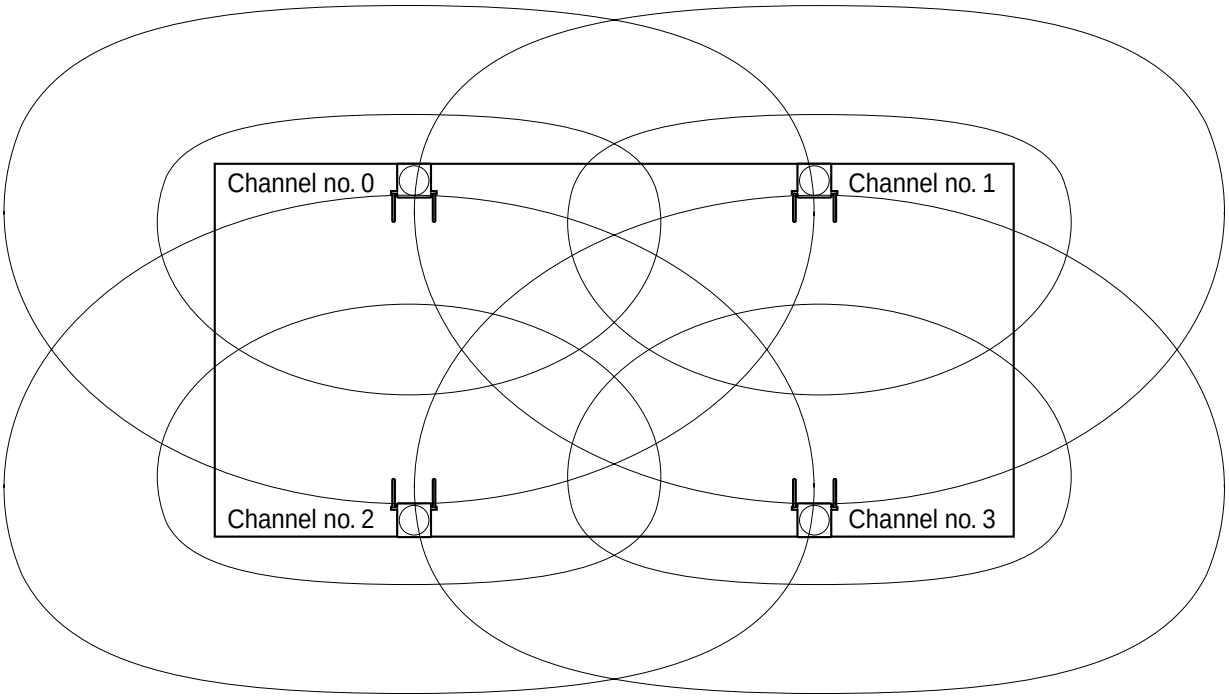
Level: 00	Out of range
Level: 01 to 02	Catches noise easily or disconnects
Level: 03 to 07	May catch noise
Level: 08 to 10	Good
Level: 11 to 12	Better

3. Repeat the steps 1 and 2 for other CSs, and relocate the CSs when necessary.

a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 m to 10 m.



b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.

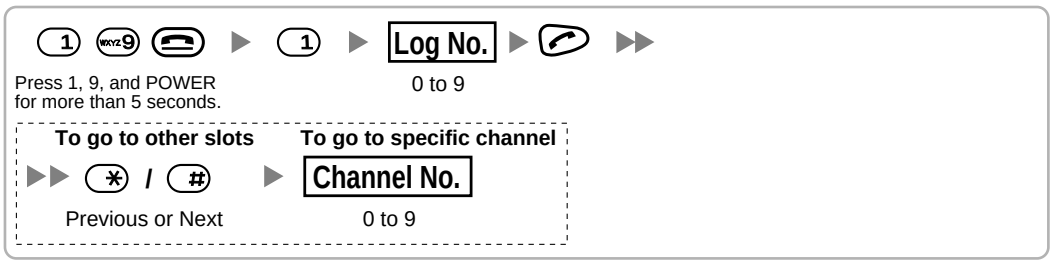


c. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Notes

- If a channel is set, the results of measurement for the 24 slots on the channel are saved each time. If the same channel is set, the new results override the previous ones. Therefore, a measurement of 10 channels × 24 slots in total can be made.
- If correct results cannot be obtained (e.g., there are many error counters), change the allocation of the CS and repeat the site survey to select the best location.

Referring the Stored Scan Data



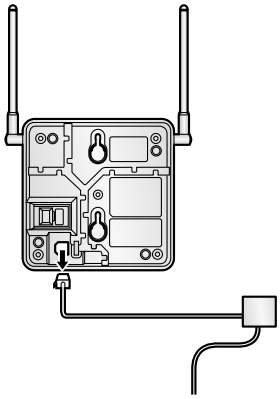
Clearing the Stored Scan Data

When "CLEAR SCAN DATA" is displayed after turning on the PS, it is required to clear the scan data.

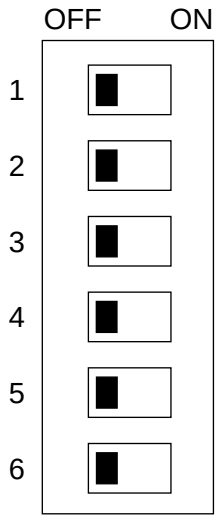
2.7.6 After Site Survey

After obtaining the proper measurement results, exit the Radio Signal Test mode before connecting the CS to the Hybrid IP-PBX.

1. Keep pressing ⏻ of the PS until the PS is turned OFF.
2. Disconnect the AC adaptor or battery box from the CS and stop supplying electricity.



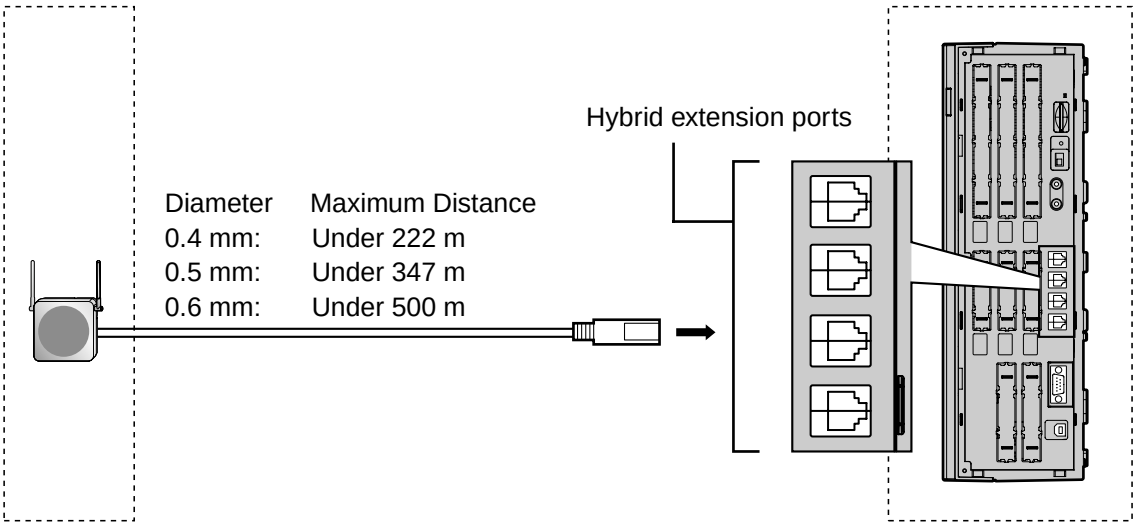
3. Switch all DIP switches of the CS from ON to OFF.



2.7.7 Connecting the Cell Station to the Hybrid IP-PBX

Refer to the following example to connect a CS to the Hybrid IP-PBX.

Connecting to a hybrid extension port



CS (RJ11)

Signal Name	Pin No.
D1	1
	2
	3
D2	4

DLC4 card, DLC8 card or a hybrid extension port

Pin No.	Signal Name
1	D1
2	
3	
4	D2

Accessory and User-supplied Items for the CS

Accessory (included): screws × 2, washers × 2, ferrite core × 1

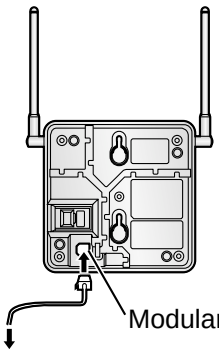
User-supplied (not included): RJ11 connector

Note

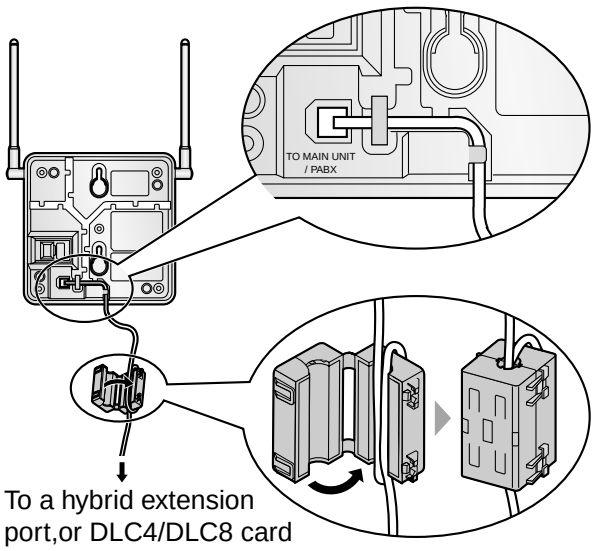
For details about DLC4 card or DLC8 card, refer to "2.4.2 SLC4 Card" or "2.4.3 DLC8 Card".

Connecting the CS

1. Connect the cable from a hybrid extension port, the DLC4/DLC8 card to the CS.

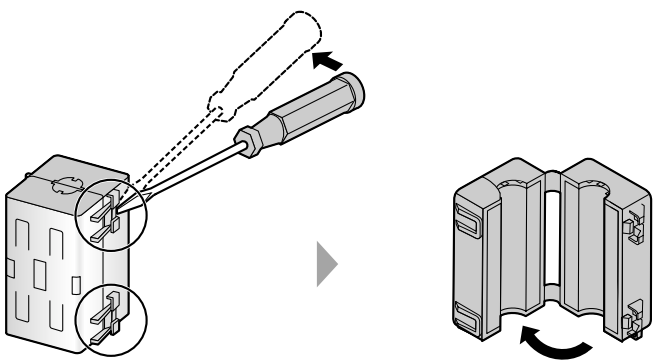


2. Pass the cable through the groove of the CS (in any direction depending on your convenience). Wrap the cable once around the ferrite core. Then close the case of the ferrite core.



Note

If you need to open the ferrite core, use a flathead screwdriver to unlatch the case of the ferrite core.



Registering the PS

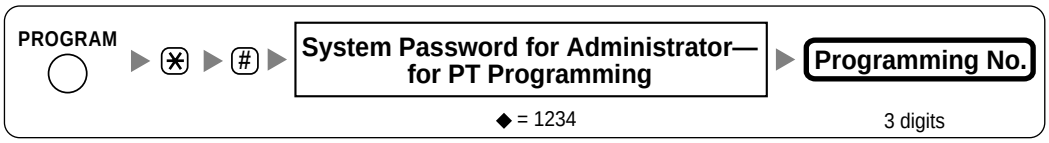
The PS must be registered to the Hybrid IP-PBX by programming both the PS and Hybrid IP-PBX before it can be used. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

For details about system programming using a PT, refer to "2.3.2 PT Programming" and "3.3 PT Programming" in the Feature Guide.

Entering the Hybrid IP-PBX System Programming Mode Using a PT

Administrator Level



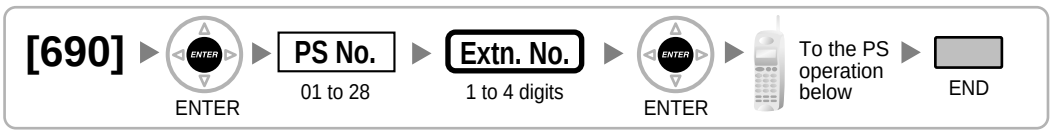
User Level

Note

◆ means default value.

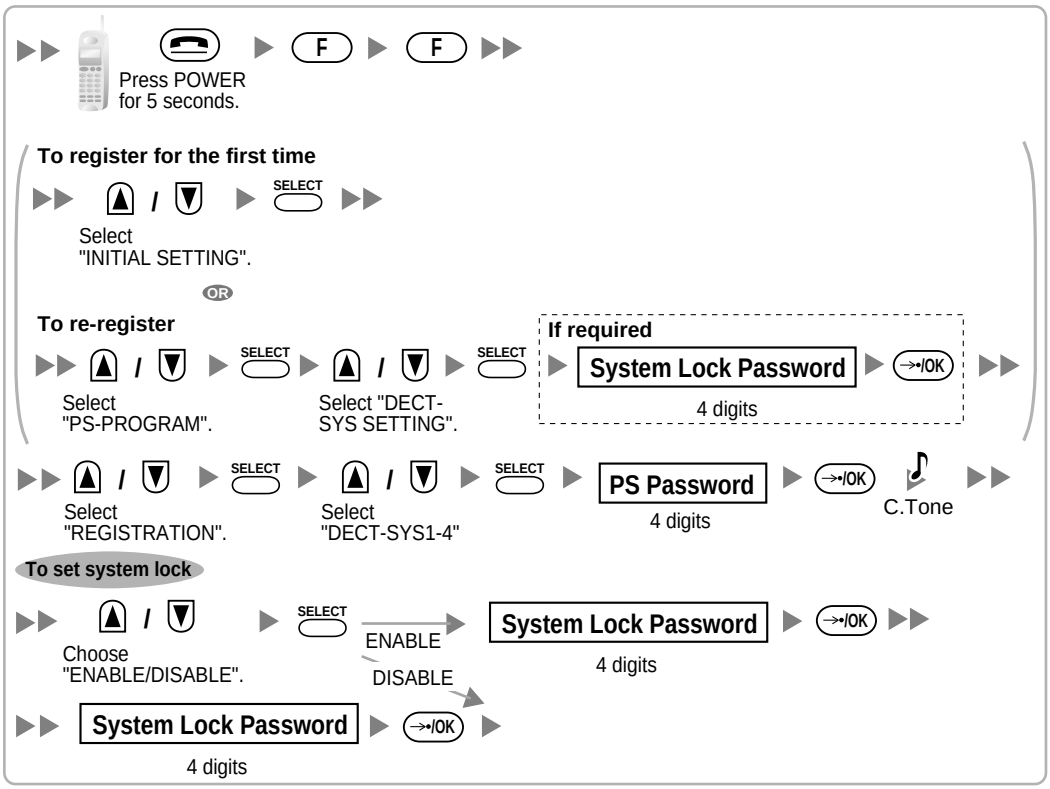
PS Registration

One PS can be registered to a maximum of 4 different Hybrid IP-PBXs.

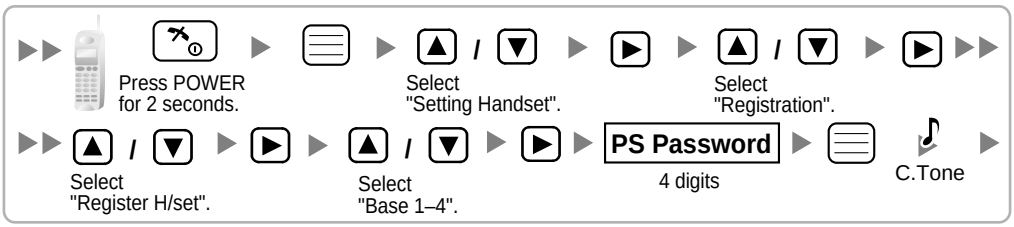


Using the KX-TD7590

System lock can be set after PS registration. When system lock is enabled, the system lock password will be required for system setting.

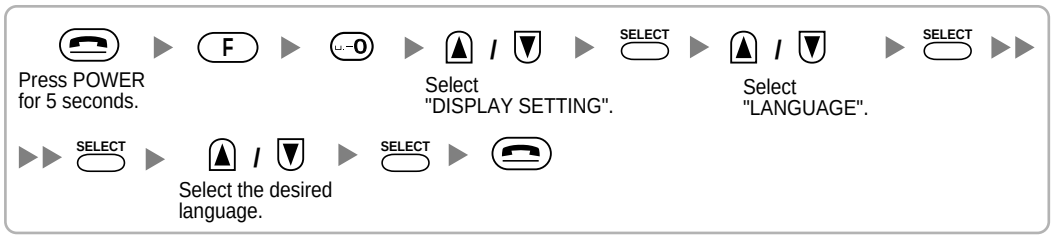


Using the KX-TD7580

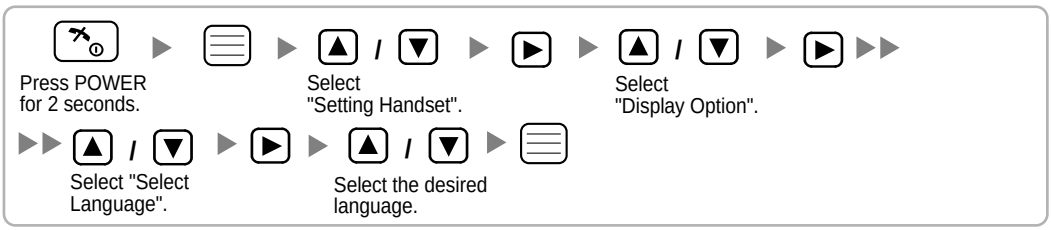


Changing the Display Language of the PS

Using the KX-TD7590



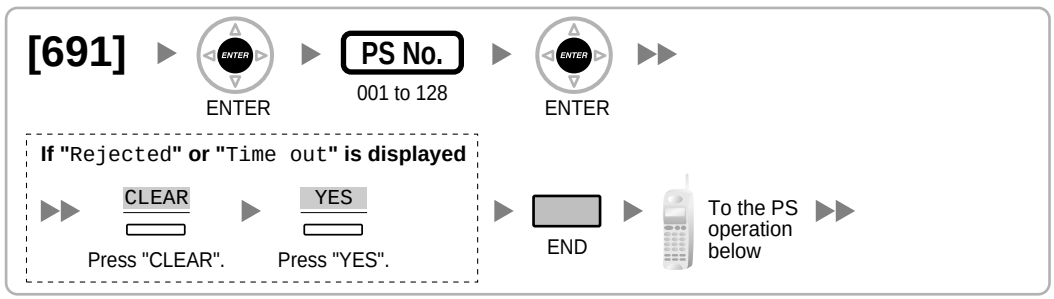
Using the KX-TD7580



PS Termination

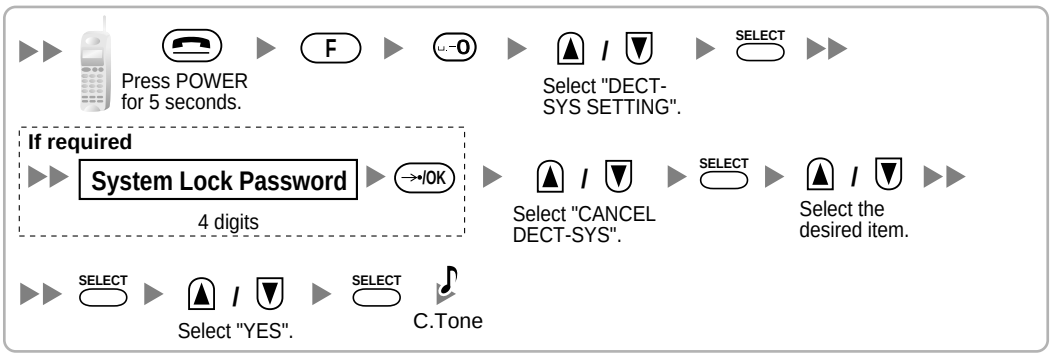
Confirm the following before cancelling the PS registration:

- PS is turned on.
- PS is within the range.

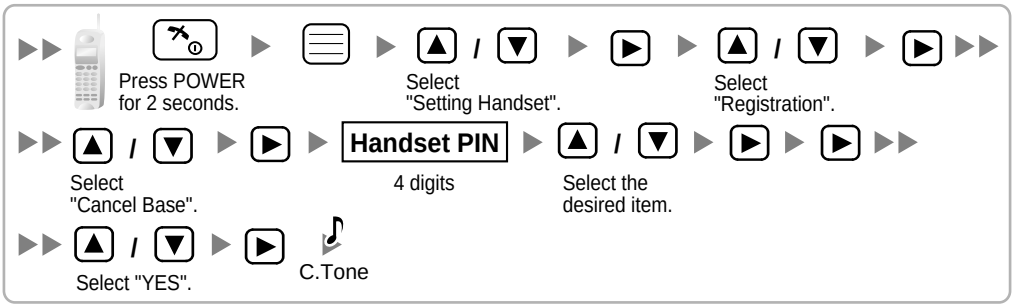


If the registration information is still stored in the PS

Using the KX-TD7590



Using the KX-TD7580



Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install additional CS.

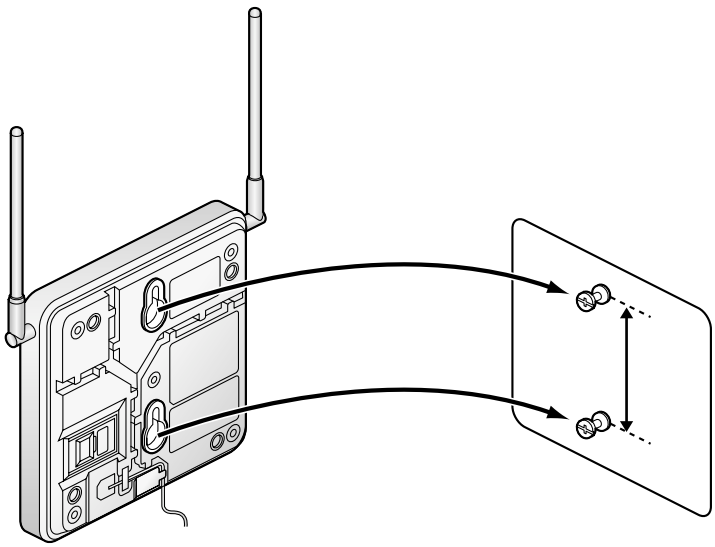
2.7.8 Wall Mounting

1. Place the reference for wall mounting on the following page on the wall to mark the 2 screw positions.
2. Install the 2 screws (included) into the wall.

Notes

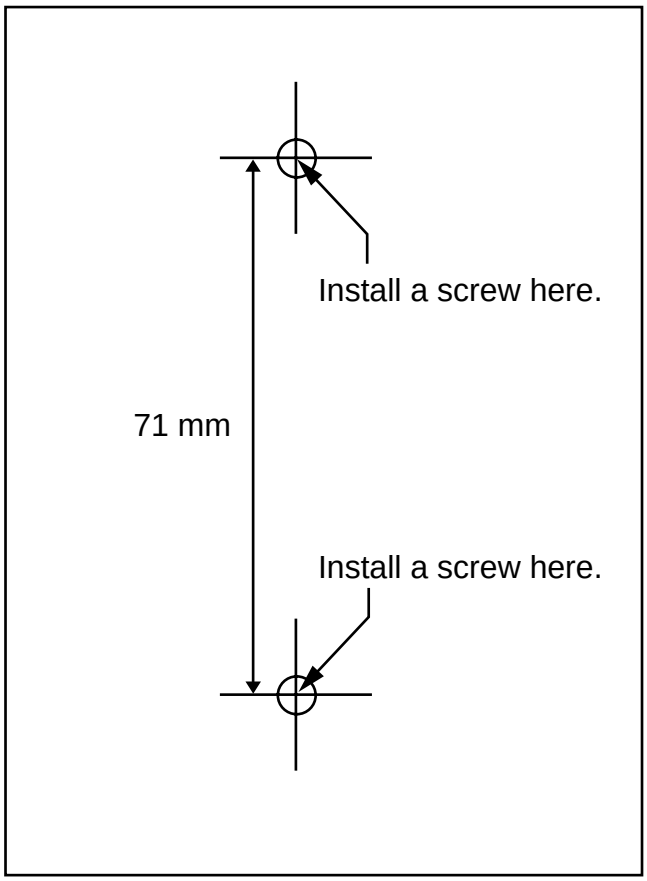
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the CS on the screw heads.



Reference for Wall Mounting

Please copy this page and use as a reference for wall mounting.



Note

When you print out this page, the distance on the paper output may deviate slightly from the number indicated above.

2.8 Connection of 2.4 GHz Portable Stations

2.8.1 Overview

The following equipment is required to connect the wireless system:

CS: Cell Station (KX-TDA0141)

This unit determines the area covered by the wireless system. Up to 2 calls can be made at the same time through each CS.

PS: 2.4 GHz Portable Station (KX-TD7690/KX-TD7680)

The KX-TDA30 can support up to 28 PSs. For more details about the PS, refer to the PS Operating Instructions.

CAUTION

- The CS should be kept free of dust, moisture, high temperature (more than 40 °C), low temperature (less than 0 °C), vibration, and should not be exposed to direct sunlight.
- The CS should not be placed outdoors (use indoors).
- The CS should not be placed near high voltage equipment.
- The CS should not be placed on a metal object.
- Systems using 2.4 GHz ISM (Industrial, Scientific and Medical) band may interfere with the KX-TDA wireless system. Examples of such systems are cordless telephones, wireless LAN, Home RF, microwave ovens and other ISM devices. These systems may cause minor noise.
- Keeping some distance between the equipment listed below may prevent interference. (The distance may vary depending on the environment.)

Equipment	Distance
CS and office equipment such as a computer, telex, fax machine, etc.	More than 2 m
CS and PS	More than 1 m
Each PS	More than 0.5 m
Hybrid IP-PBX and CS	More than 2 m
CS and CS	More than 15 m

Please take into consideration the distance between the CSs when site planning. Please consult a certified dealer for details.
However, the required distance between CSs may vary depending on the environment of the installation site and conditions in which the wireless system is used. Conduct the site survey to determine the appropriate distance.

2.8.2 Procedure Overview

When connecting the wireless system, use extreme care to conduct a site survey. Inadvertent site survey can result in narrow service area, frequent noise, and disconnection of calls.

1. Investigate the installation site

Refer to "2.8.3 Site Planning".

a. Obtain the map of the CS installation site.

b. Consider the service area demanded by the user on the map.

c. Plan the locations of each CS, taking account of distance, building materials and etc.

2. Prepare the CS for site survey

Refer to "2.8.4 Before Site Survey".

a. Assign a CS number to each CS by setting the DIP switches on the back of the CS.

b. Supply electricity to each CS using an AC adaptor or a battery box.

c. Install each CS temporarily as planned.

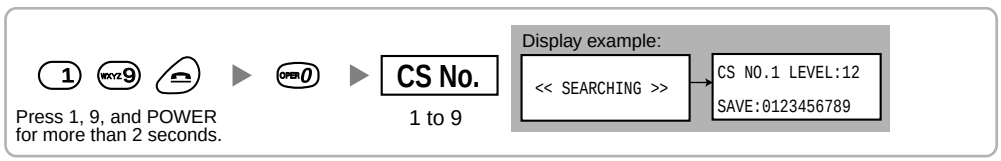
Notes

- Install at least 2 m above the floor.
- Keep the antennas in the upright positions.

3. Conduct the site survey

Refer to "2.8.5 Site Survey".

a. Test the radio signal strength using the PS.
Confirm that the radio signal strength level is "12" near the CS.



b. By walking away from the CS with the PS, check the radio signal strength. The radio signal strength weakens as you walk away from the CS.

c. Map the CS coverage area at radio signal strength levels "3" and "8".

d. Make sure that adjacent CS coverage areas overlap where the radio signal strength level is "8" by at least 5 m.

e. Make sure that the radio signal strength level is greater than "3" at any location within the service area demanded by the user.

4. Finish the site survey

Refer to "2.8.6 After Site Survey".

a. Return all DIP switches of each CS to the OFF position, and stop supplying electricity.

b. Turn off the PS.

5. Connect the CS and PS to the Hybrid IP-PBX and test the operation

Refer to "2.8.7 Connecting the Cell Station to the Hybrid IP-PBX".

a. Connect the CSs to the Hybrid IP-PBX.

b. Register the PSs to the Hybrid IP-PBX.

c. Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install additional CS.

6. Mount the CS on the wall

Refer to "2.8.8 Wall Mounting".

a. If everything assuredly goes as planned, mount the CS on the wall.

2.8.3 Site Planning

Choosing the best site for the CS requires careful planning and testing of essential areas. The best location may not always be convenient for installation. Read the following information before installing the unit.

Understanding the Radio Waves

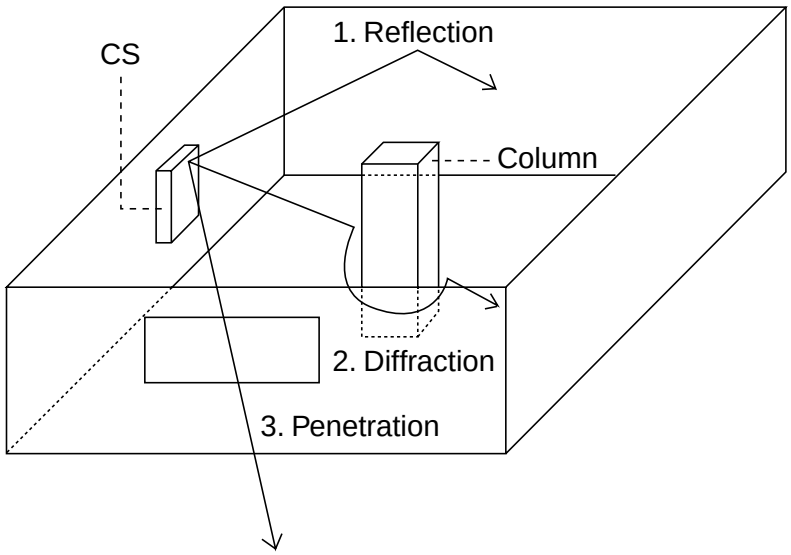
Characteristics of Radio Waves

The transmission of radio waves and the CS coverage area depend on the structure and materials of the building.

Office equipment, such as computers and fax machines, can interfere with radio waves. Such equipment may create noise or interfere with the performance of the PS.

The illustration below shows the special transmitting patterns of radio waves.

1. Radio waves are reflected by objects such as those made of metal.
2. Radio waves are diffracted by objects such as metallic columns.
3. Radio waves penetrate objects such as those made of glass.



Relationships Between Radio Waves and Building Structure and Materials

- The CS coverage area is affected more by the building materials and their thickness than the number of obstacles.
- Radio waves tend to be reflected or diffracted by conductive objects and rarely penetrate them.
- Radio waves tend to penetrate insulated objects and are rarely reflected by them.
- Radio waves penetrate thin objects more than thick objects.
- The table below shows the transmission tendency of radio waves when they reach objects made from various materials.

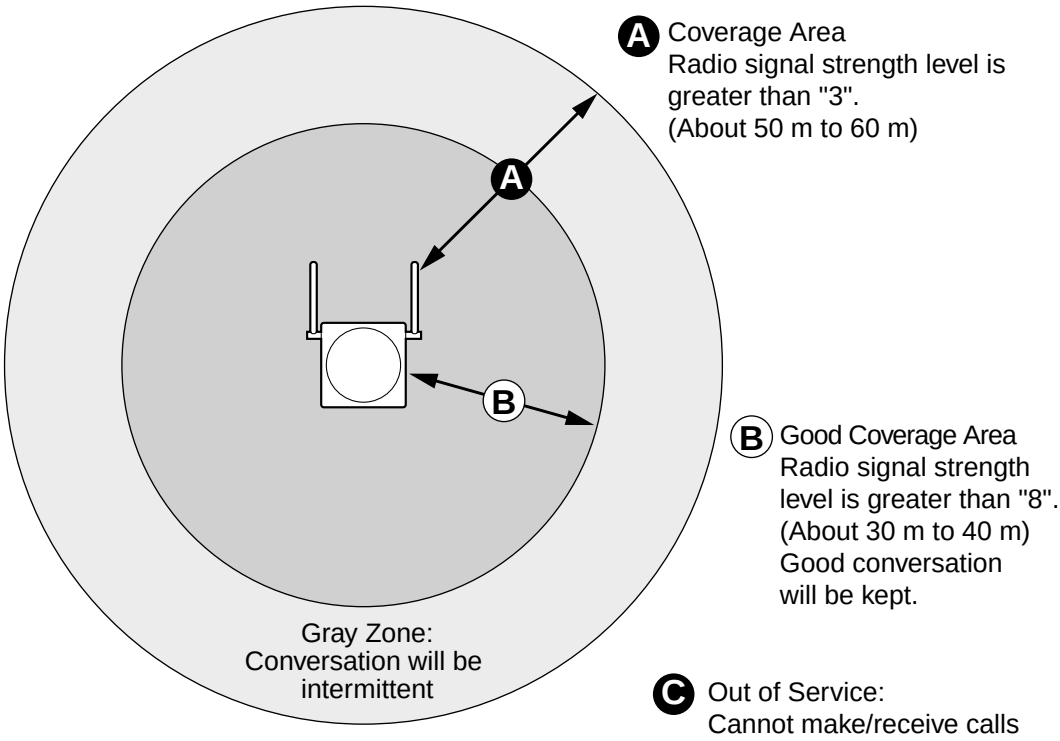
Object	Material	Transmission Tendency
Wall	Concrete	The thicker they are, the less radio waves penetrate them.
	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Window	Glass	Radio waves usually penetrate them.
	Glass with wire nets	Radio waves can penetrate them, but tend to be reflected.
	Glass covered with heat-resistant film	Radio waves are weakened considerably when they penetrate windows.
Floor	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves are reflected.
Partition	Steel	Radio waves are reflected and rarely penetrate them.
	Plywood, Glass	Radio waves usually penetrate them.
Column	Ferroconcrete	Radio waves can penetrate them, but the more iron there is, the more radio waves tend to be reflected or diffracted.
	Metal	Radio waves tend to be reflected or diffracted.
Cabinet	Steel	Radio waves are usually reflected or diffracted, and rarely penetrate them.
	Wood	Radio waves can penetrate them, but they are weakened.

CS Coverage Area

The example below shows the size of the coverage area of 1 CS if it is installed where there is no obstacle.

Note

Radio signal strength levels are measured during the site survey (refer to "2.8.5 Site Survey").


A Coverage Area
Radio signal strength level is greater than "3".
(About 50 m to 60 m)
A
B
B Good Coverage Area
Radio signal strength level is greater than "8".
(About 30 m to 40 m)
Good conversation will be kept.
Gray Zone:
Conversation will be intermittent
C Out of Service:
Cannot make/receive calls

Radio Signal Strength Levels

Level: 00	Out of range
Level: 01 to 02	Catches noise easily or disconnects
Level: 03 to 07	May catch noise
Level: 08 to 10	Good
Level: 11 to 12	Better

Site Survey Preparation

1. Obtain the map and investigate the installation site.
   - **a.** Check the obstacles (e.g., shelves, columns, and partitions).
   - **b.** Check the materials of the structures (e.g., metal, concrete, and plywood).
   - **c.** Check the layout and dimensions of the room, corridor, etc.
   - **d.** Write down the above information to the map.
2. Examine the service area demanded by the user on the map, referring to the following example.
   - **a.** Draw the coverage area around a CS. Extend the coverage area to 30 m to 60 m in one direction, depending on the materials of the building structures and obstacles in the installation site. Note that a CS cannot be installed outside a building.

b. If one CS cannot cover the entire service area, install additional CSs as required. Overlap the coverage areas of adjacent CSs.
Where CS coverage areas overlap, the PS will start call handover to the next CS if the signal from one CS becomes weak. However, if a PS moves away from a CS and there are no CSs available for handover, the PS may go out of range and the call could be lost.
If the signal from the CS fades, due to the structure of the building, there may be some handover delay. The user will hear a range warning before handover in this case. This also applies in the case of interference from 2.4 GHz apparatus.

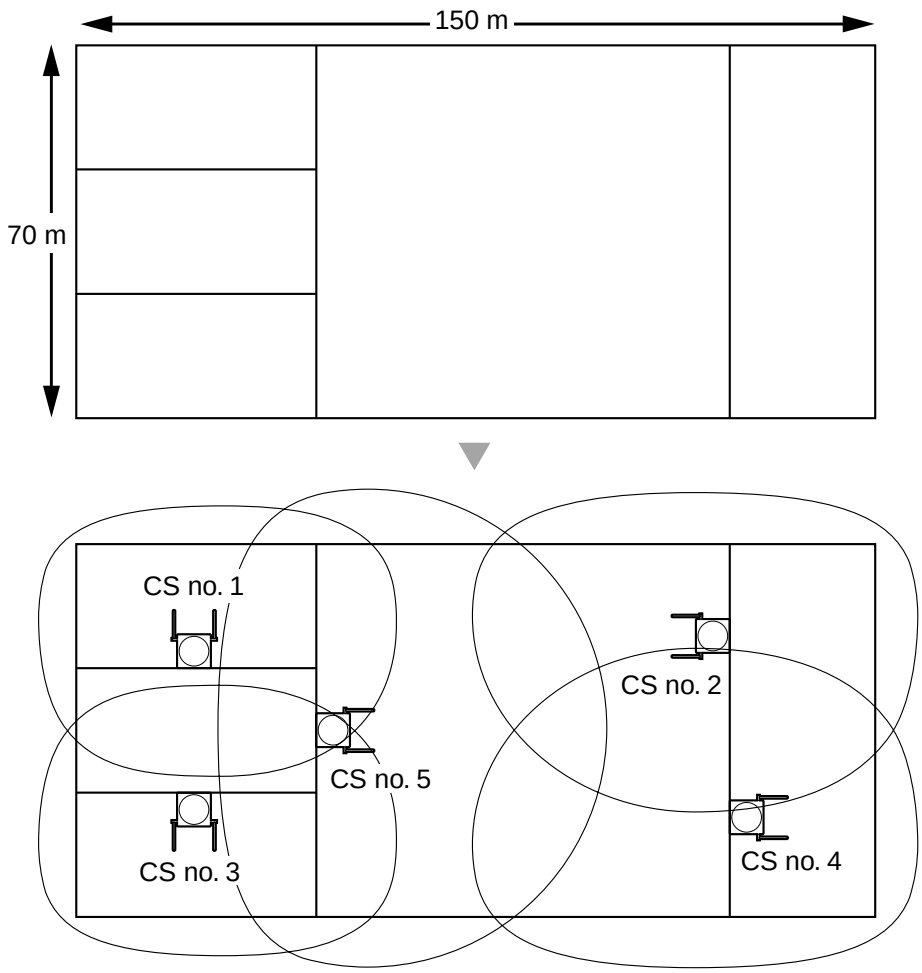
Example: Installing in a Room Separated by Walls

Things to take note of:

- The room is separated by walls.
- The room is surrounded by concrete walls.

CS installation plan:

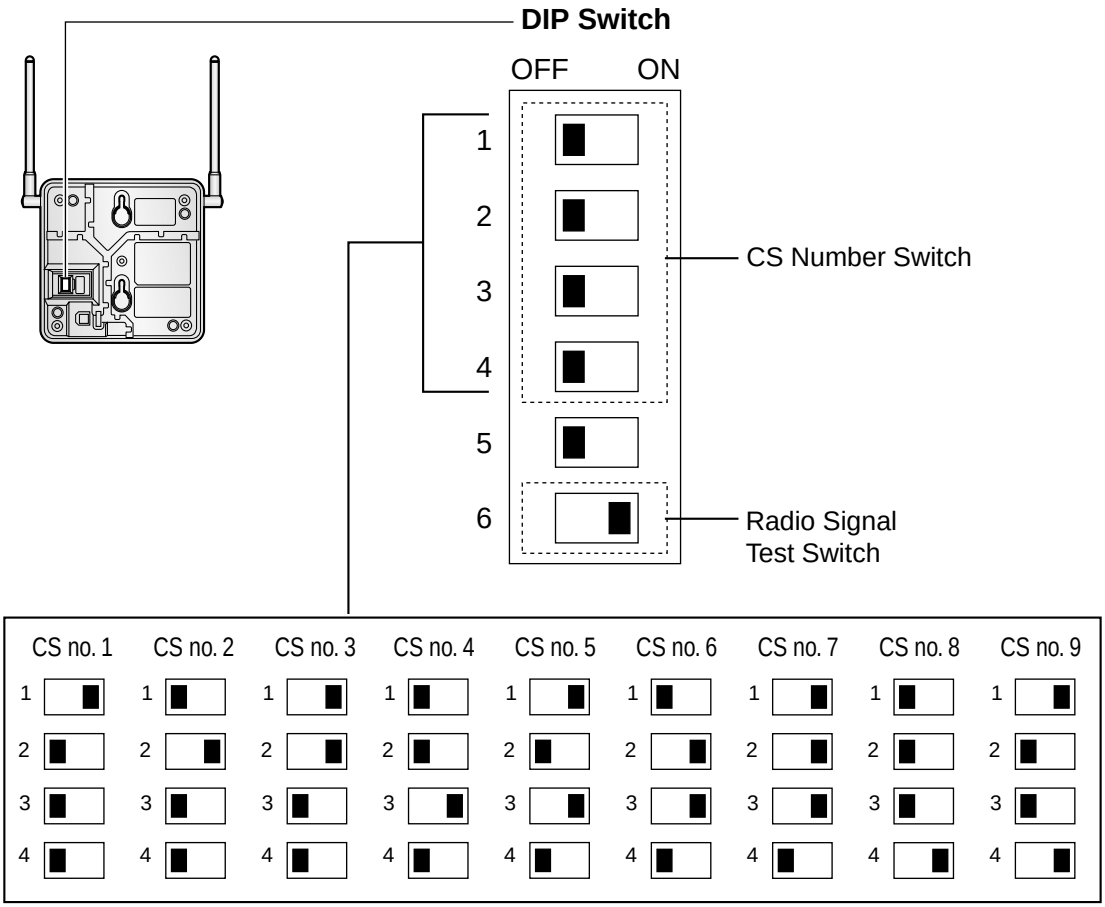
- The coverage area of each CS will not extend as much it does where there is no obstacle, because the radio signals will be weakened by separating walls. Therefore, you will need 5 CSs to cover the entire room.



2.8.4 Before Site Survey

Setting and Installing the CS Temporarily for Site Survey

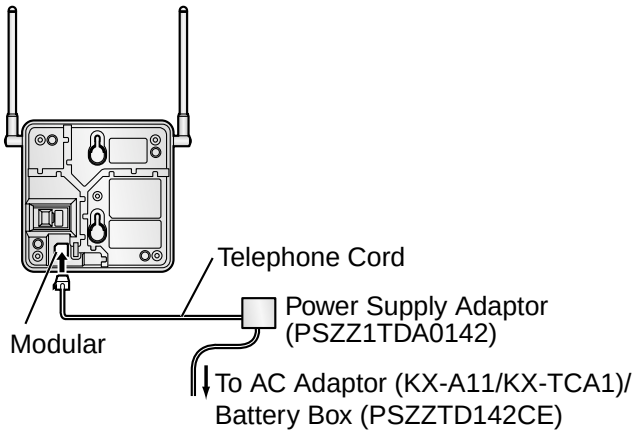
1. Switch the Radio Signal Test switch from OFF to ON.
2. Set the CS number switches as desired.



Notes

- To see the radio signal strength of more than 1 CS, a CS number must be set for each CS.
- If more than 1 CS is in Radio Signal Test mode, each CS must have a unique CS number.

3. After setting the DIP switch, connect an AC adaptor or battery box to the CS using a power supply adaptor.



4. Install the CS temporarily for the site survey. Install the CS at least 2 m above the floor, keeping the antennas in the upright positions.

2.8.5 Site Survey

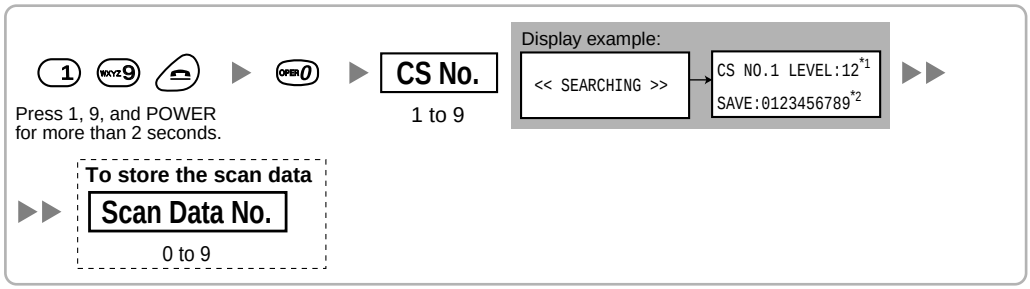
The PS has a Radio Signal Test mode that monitors the state of the radio link to the CS. After installing the CSs temporarily, set the PS to the Radio Signal Test mode and measure each CS coverage area. Then, record the results on the map of the installation site.

Testing the Radio Signal Strength

Note

The display language for the site survey is available only in English.

1. Enter the Radio Signal Test mode.



Notes

*1: CS number and radio signal strength level.

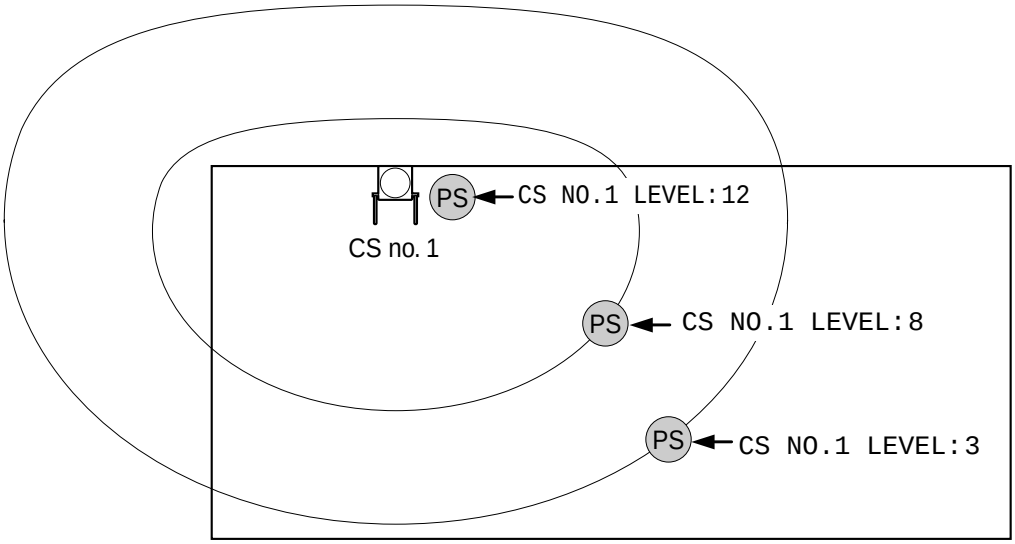
*2: Scan data (test result) number. Empty memory space will be indicated by a number; stored memory space will be indicated by a "-".

2. Measure the radio signal strength by moving to and away from the CS.

a. Move to the CS until the point the radio signal strength level becomes "12".

b. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "8". Draw the area on the map.

c. Move away from the CS and identify the CS coverage area within which the radio signal strength level is greater than "3". Draw the area on the map.

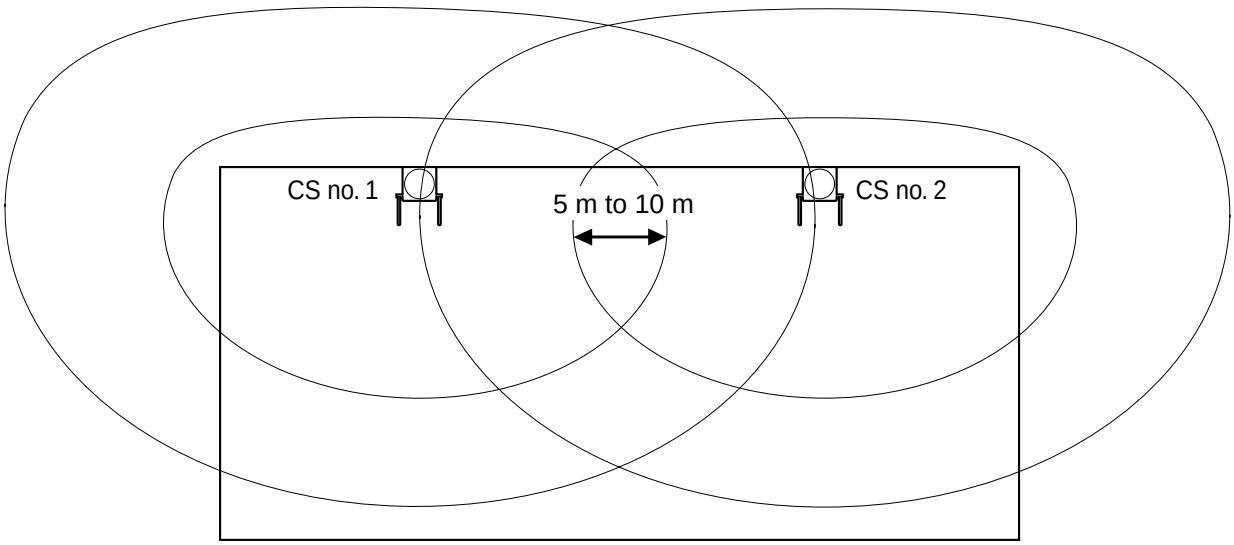


Radio Signal Strength Levels

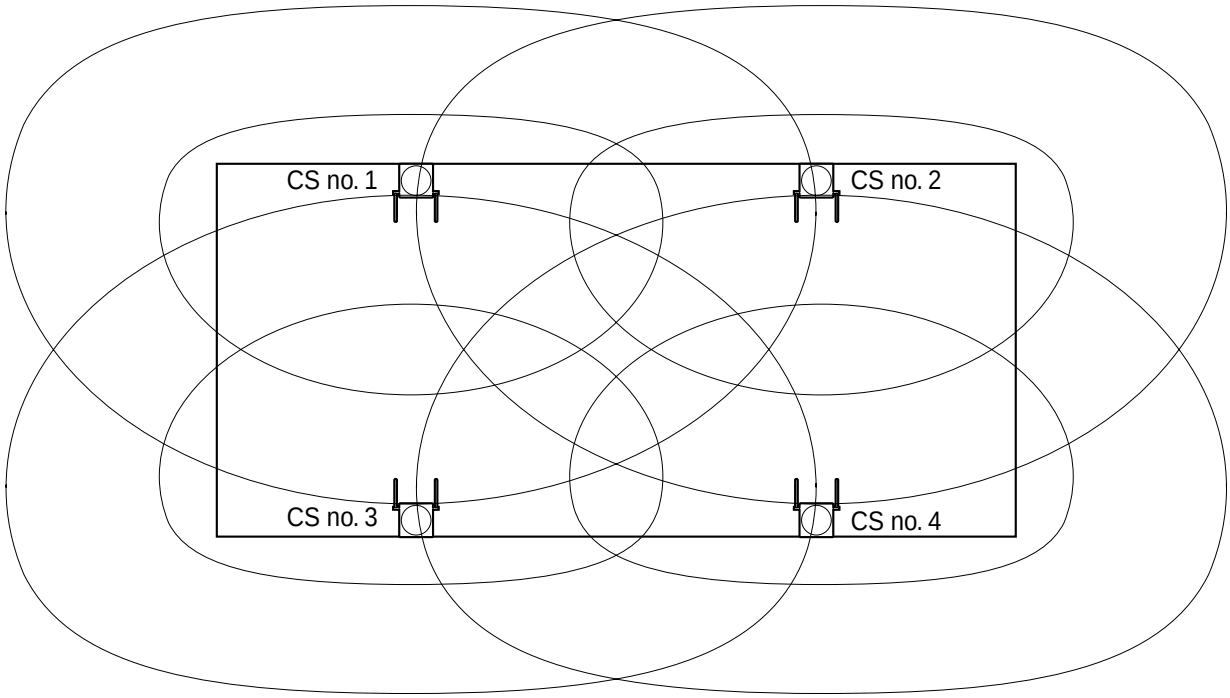
Level: 00	Out of range
Level: 01 to 02	Catches noise easily or disconnects
Level: 03 to 07	May catch noise
Level: 08 to 10	Good
Level: 11 to 12	Better

3. Repeat the steps 1 and 2 for other CSs, and relocate the CSs when necessary.

a. Overlap adjacent CS coverage areas where the radio signal strength level is "8" by 5 m to 10 m.

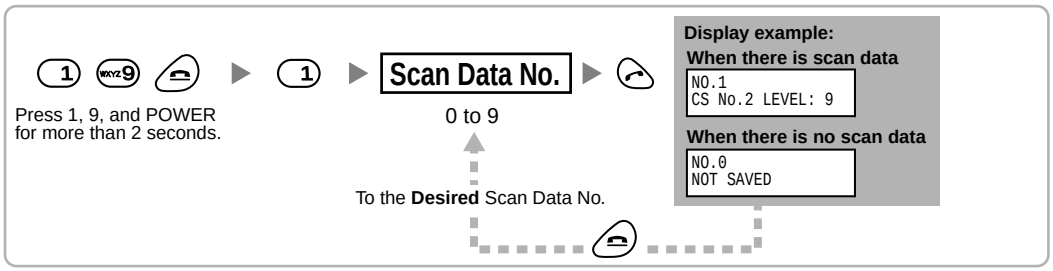


b. Overlap the CS coverage areas of at least 2 CSs at any location in the installation site.

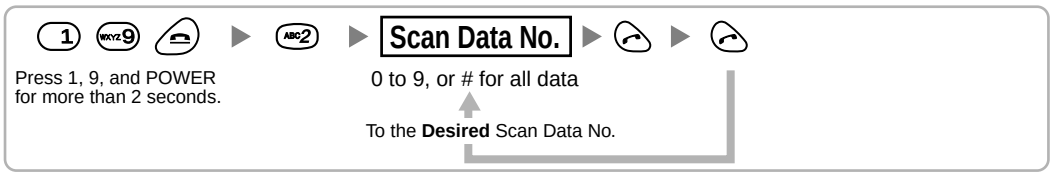


c. Make sure that the radio signal strength level is greater than "3" at any location in the service area demanded by the user.

Referring the Stored Scan Data



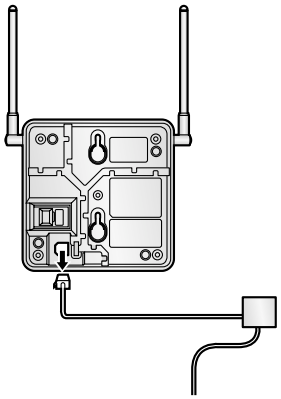
Deleting the Stored Scan Data



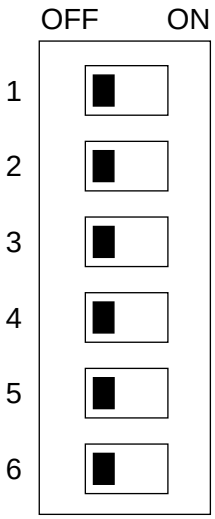
2.8.6 After Site Survey

After obtaining the proper measurement results, exit the Radio Signal Test mode before connecting the CS to the Hybrid IP-PBX.

1. Keep pressing of the PS until the PS is turned OFF.
2. Disconnect the AC adaptor or battery box from the CS and stop supplying electricity.



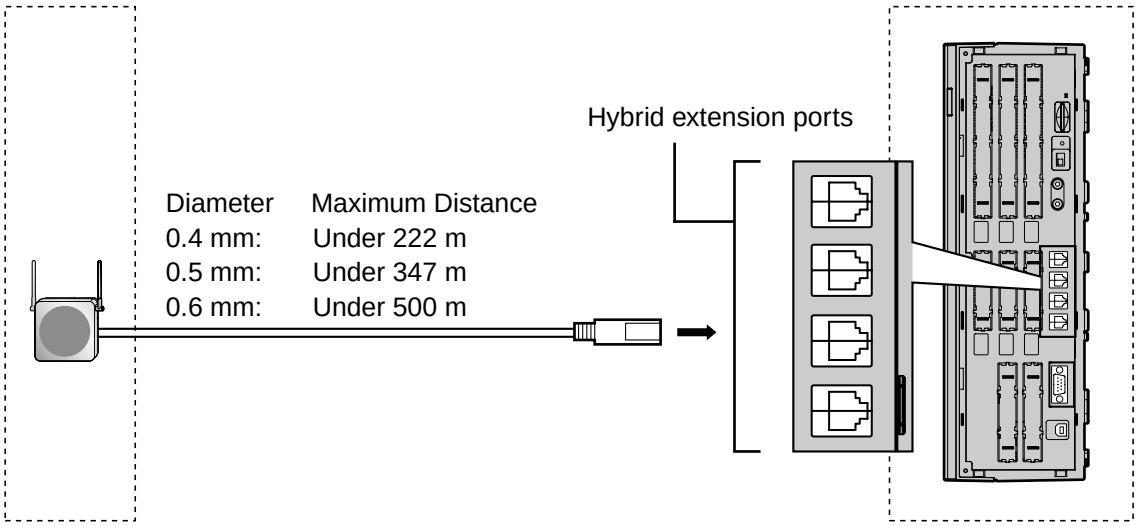
3. Switch all DIP switches of the CS from ON to OFF.



2.8.7 Connecting the Cell Station to the Hybrid IP-PBX

Refer to the following example to connect a CS to the Hybrid IP-PBX.

Connecting to a hybrid extension port



CS (RJ11)

Signal Name	Pin No.
D1	1
	2
	3
D2	4

DLC4 card, DLC8 card or a hybrid extension port

Pin No.	Signal Name
1	D1
2	
3	
4	D2

Accessory and User-supplied Items for the CS

Accessory (included): screws × 2, washers × 2

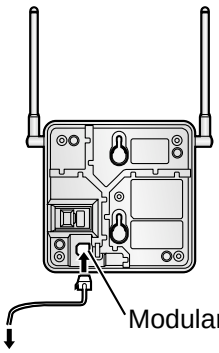
User-supplied (not included): RJ11 connector

Note

For details about DLC4 card or DLC8 card, refer to "2.4.2 SLC4 Card" or "2.4.3 DLC8 Card".

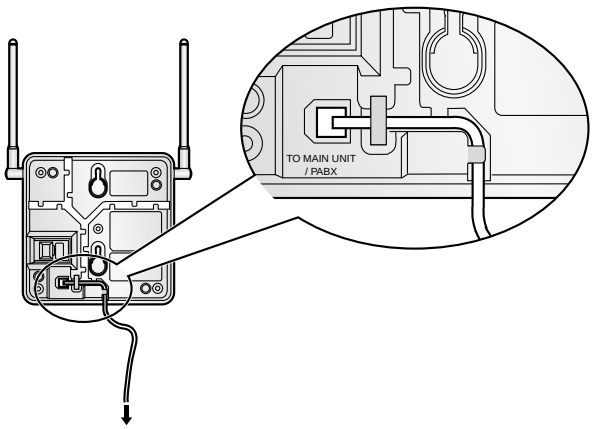
Connecting the CS

1. Connect the cable from a hybrid extension port, the DLC4/DLC8 card to the CS.



To a hybrid extension port,
or DLC4/DLC8 card

2. Pass the cable through the groove of the CS (in any direction depending on your convenience).



To a hybrid extension port,
or DLC4/DLC8 card

Registering the PS

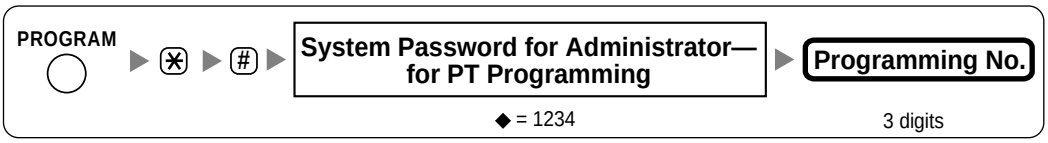
The PS must be registered to the Hybrid IP-PBX by programming both the PS and Hybrid IP-PBX before it can be used. A PT with multiline display (e.g., KX-T7636 6-line display) is required for the Hybrid IP-PBX system programming.

Note

For details about system programming using a PT, refer to "2.3.2 PT Programming" and "3.3 PT Programming" in the Feature Guide.

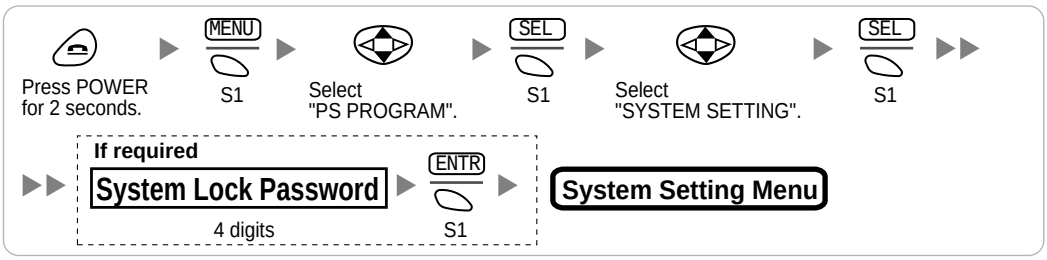
Entering the System Programming Mode

PT (Administrator Level)



PT (User Level)

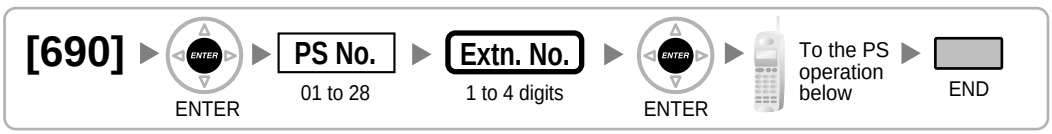
PS



Note

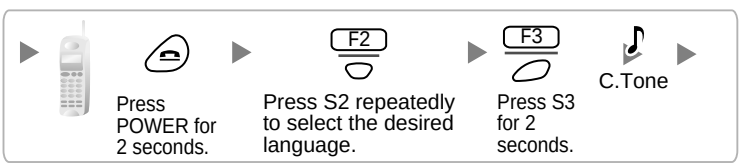
◆ means default value through this section.

PS Registration



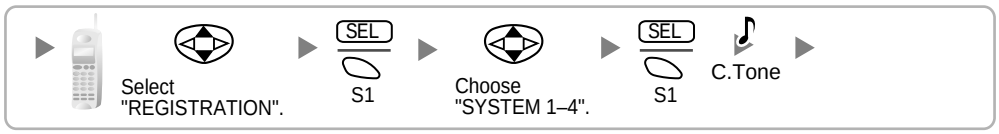
When the PS has not been registered yet

When registering the PS for the first time, it is possible to select the desired language for the display. (You do not need to enter the PS system programming mode when registering for the first time.)



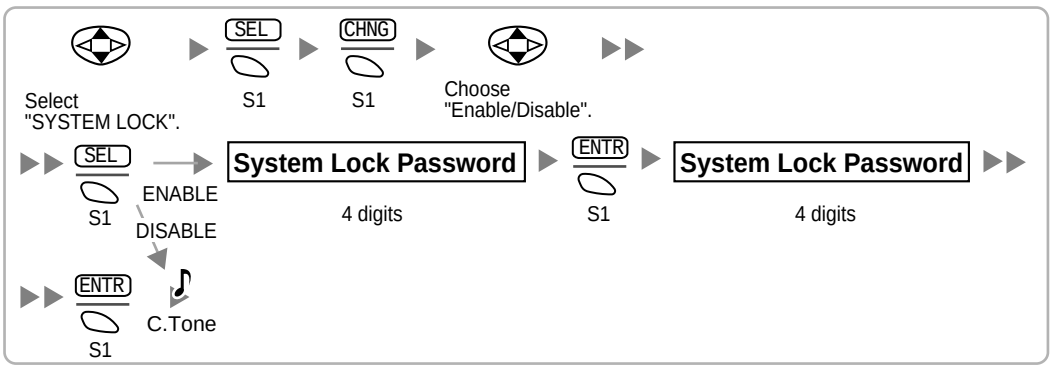
When the PS has already been registered to another Hybrid IP-PBX

One PS can be registered to a maximum of 4 different Hybrid IP-PBXs.



Setting the System Lock

When a system lock has been set, the system lock password will be required for PS system setting.



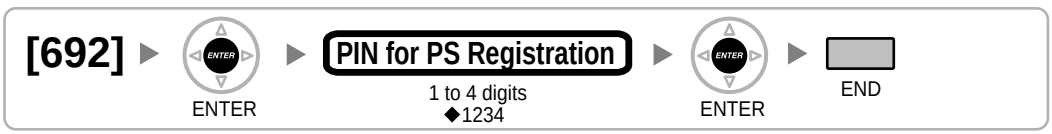
Setting the Personal Identification Number (PIN) for PS Registration

To prevent registering the PS to a wrong Hybrid IP-PBX, a PIN for PS registration can be set to the Hybrid IP-PBX. Before registering the PS to the Hybrid IP-PBX, register the PIN set to the Hybrid IP-PBX into the PS. By doing so, the PS will only be registered to the Hybrid IP-PBX with the matching PIN.

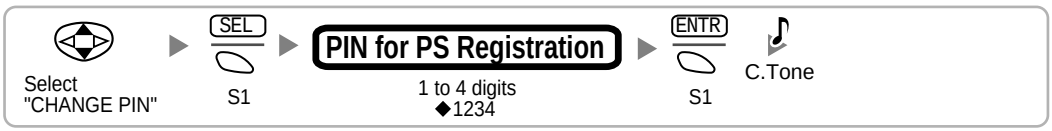
Notes

- By default, the PIN for PS registration is "1234" for both the Hybrid IP-PBX and PS. Therefore, the PS can be registered to the Hybrid IP-PBX without setting the PIN.
- The PIN for PS registration will only be used when registering the PS to the Hybrid IP-PBX. Therefore, even when there is more than 1 Hybrid IP-PBX with the same PIN near the PS, the PS will not be linked to a different Hybrid IP-PBX during normal operation after registration.

Setting the PIN for Hybrid IP-PBX



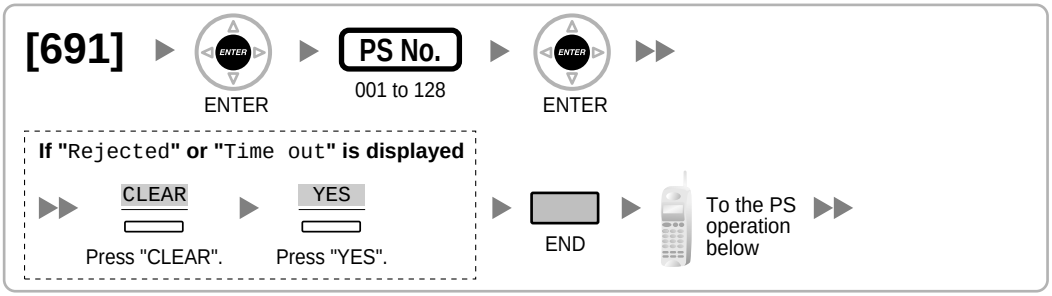
Setting the PIN for PS



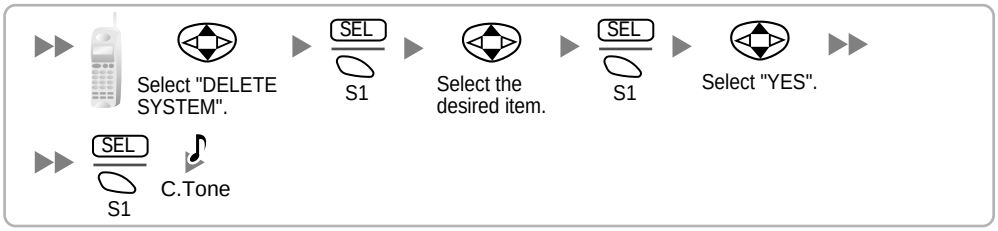
PS Termination

Confirm the following before cancelling the PS registration:

- PS is turned on.
- PS is within the range.



If the registration information is still stored in the PS



Testing the Operation

Walk around the service area while having a conversation using a registered PS. If noise is frequent or conversations disconnect, relocate the CSs or install additional CS.

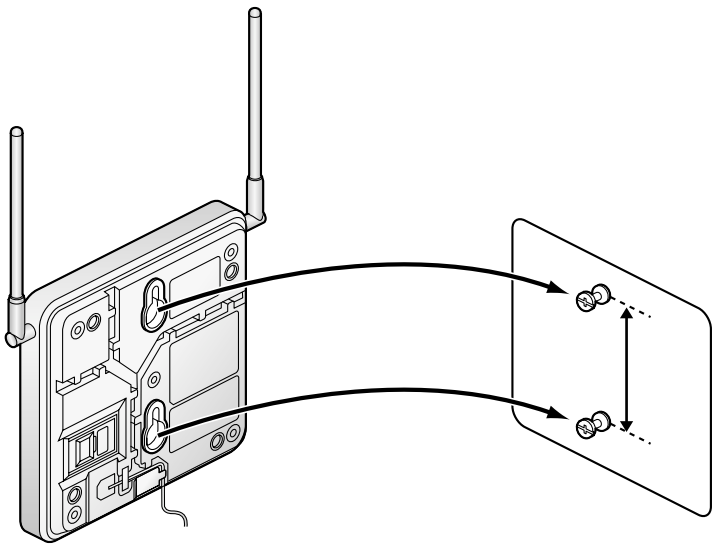
2.8.8 Wall Mounting

1. Place the reference for wall mounting on the following page on the wall to mark the 2 screw positions.
2. Install the 2 screws (included) into the wall.

Notes

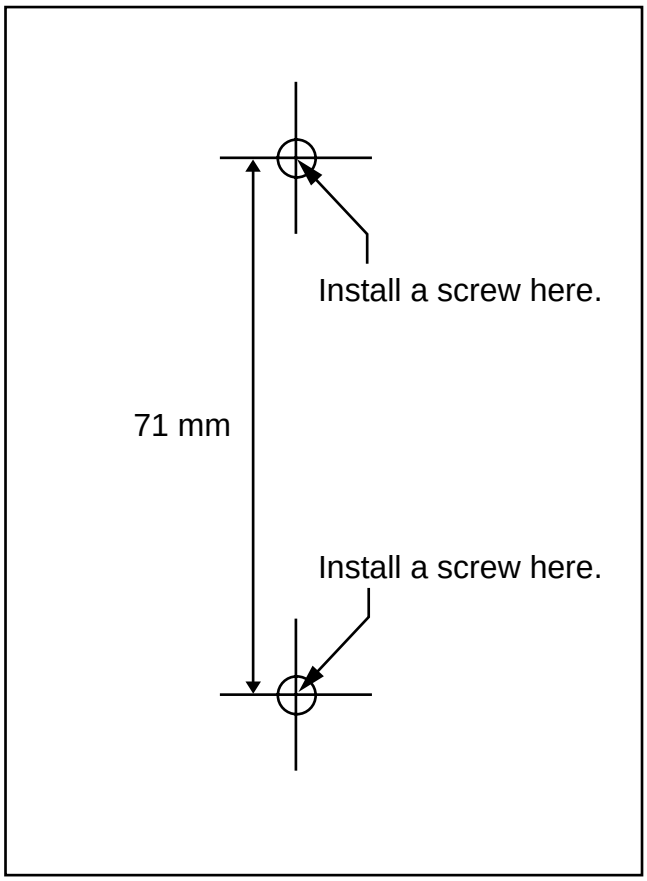
- Make sure that the screw heads are at the same distance from the wall.
- Install the screws perpendicular to the wall.

3. Hook the CS on the screw heads.



Reference for Wall Mounting

Please copy this page and use as a reference for wall mounting.



Note

When you print out this page, the distance on the paper output may deviate slightly from the number indicated above.

2.9 Connection of Doorphones and Door Openers

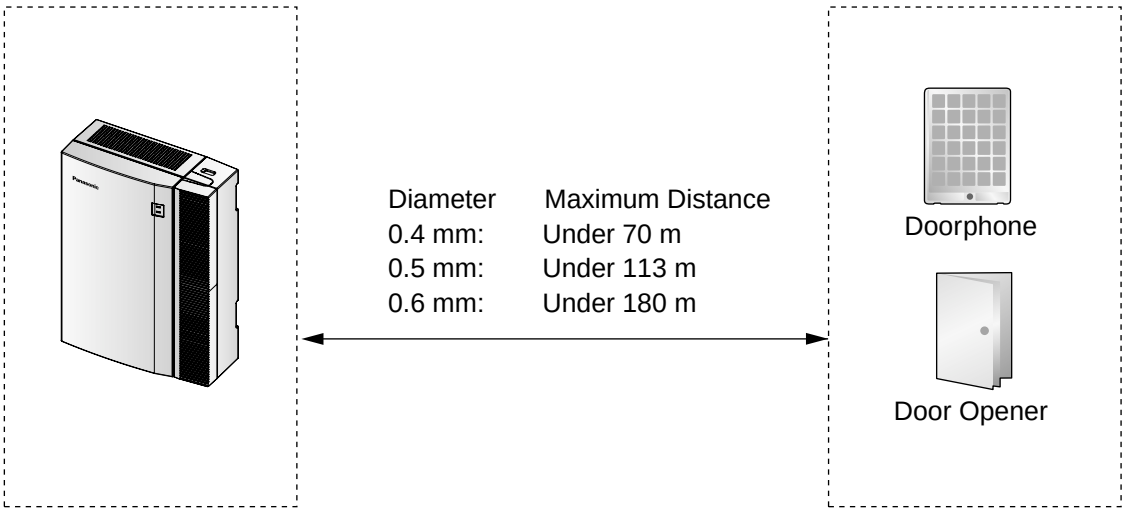
2.9.1 Connection of Doorphones and Door Openers

Maximum of 4 doorphones (KX-T30865) and door openers can be connected to the Hybrid IP-PBX with DPH4 card. Maximum of 2 doorphones (German type) and door openers can be connected to the Hybrid IP-PBX with DPH2 card.

Note

Doorphones and door openers are user-supplied.

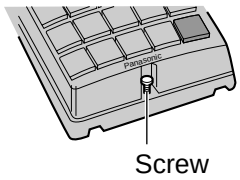
Maximum Cabling Distance



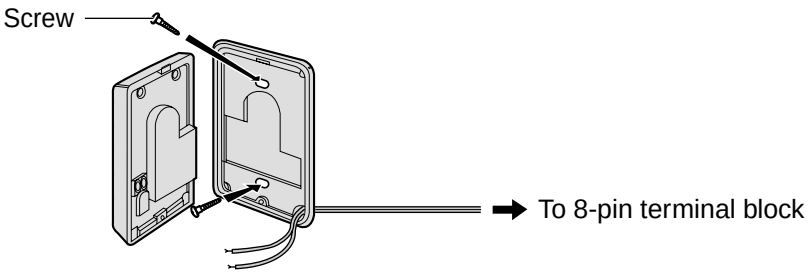
Current Limit for door opener: 24 V DC/30 V AC, 1 A maximum

Installing the Doorphone (KX-T30865)

1. Loosen the screw to separate the doorphone into 2 halves.



2. Pass the wires through the hole in the base cover, and attach the base cover to a wall using 2 screws.



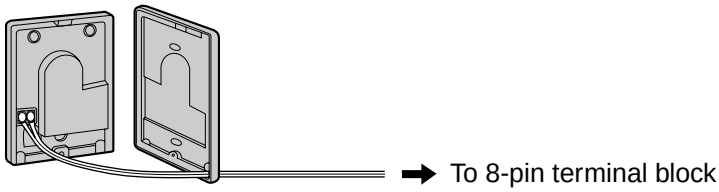
Note

Two kinds of screws are included with KX-T30865. Please choose the appropriate kind for your wall type.

: when a doorphone plate has been fixed to the wall

: when you wish to install the doorphone directly to the wall

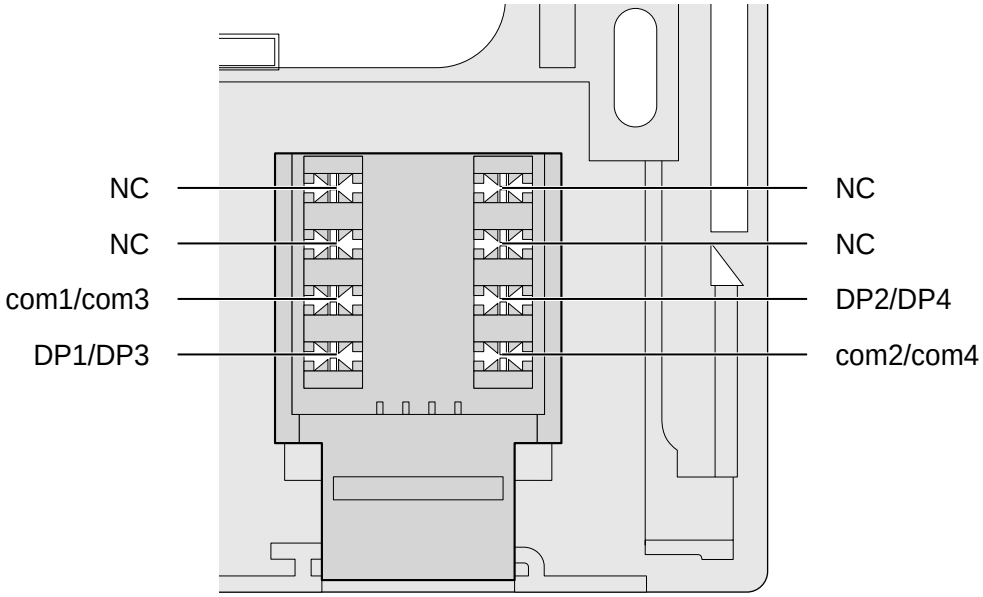
3. Connect the wires to the screws located in the front cover.



4. Re-attach the 2 halves and re-insert the screw.

Connection of Doorphones to DPH4 Card with RJ45 Connectors

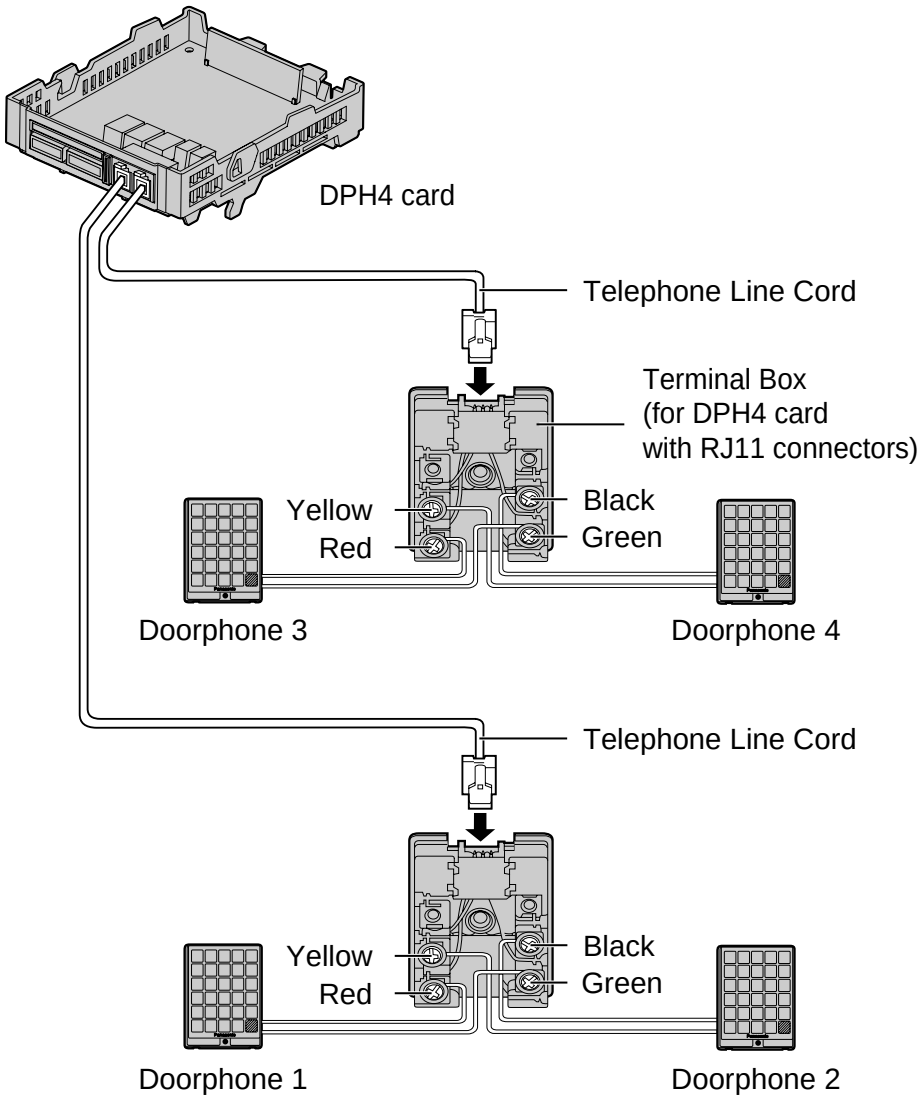
1. Connect DPH4 Card to the terminal boxes using telephone line cords.
   Refer to "2.5.1 DPH4 Card" for pin assignments.
2. Connect the wires of doorphones to the terminal box as shown below.



Terminal Box
(for DPH4 card with RJ45 connectors)

Connection of Doorphones to DPH4 Card with RJ11 Connectors

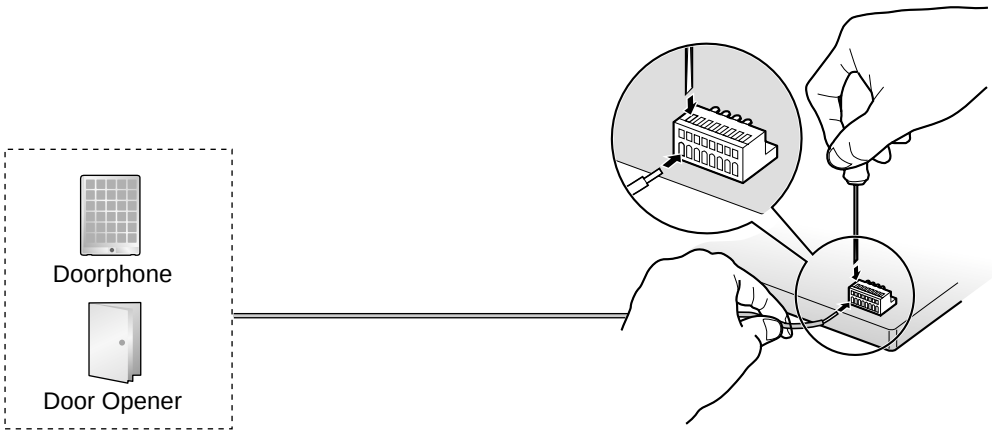
1. Connect DPH4 Card to the terminal boxes using telephone line cords.
   Refer to "2.5.1 DPH4 Card" for pin assignments.
2. Connect the wires of doorphones 1 and 3 to the red and green screws on the terminal box.
3. Connect the wires of doorphones 2 and 4 to the yellow and black screws on the terminal box.



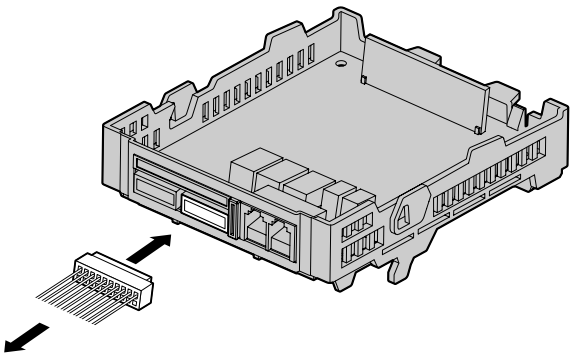
Connection of Door Openers to DPH4 Card

Use 8-pin and 10-pin terminal blocks (included with the card) for connection.

1. While pressing down on the hole at the top of the terminal block using a screwdriver, insert the wire into the side hole as shown below. Repeat this procedure for other doorphones and door openers.
   Refer to "2.5.1 DPH4 Card" and "2.5.2 DPH2 Card" for pin assignments.



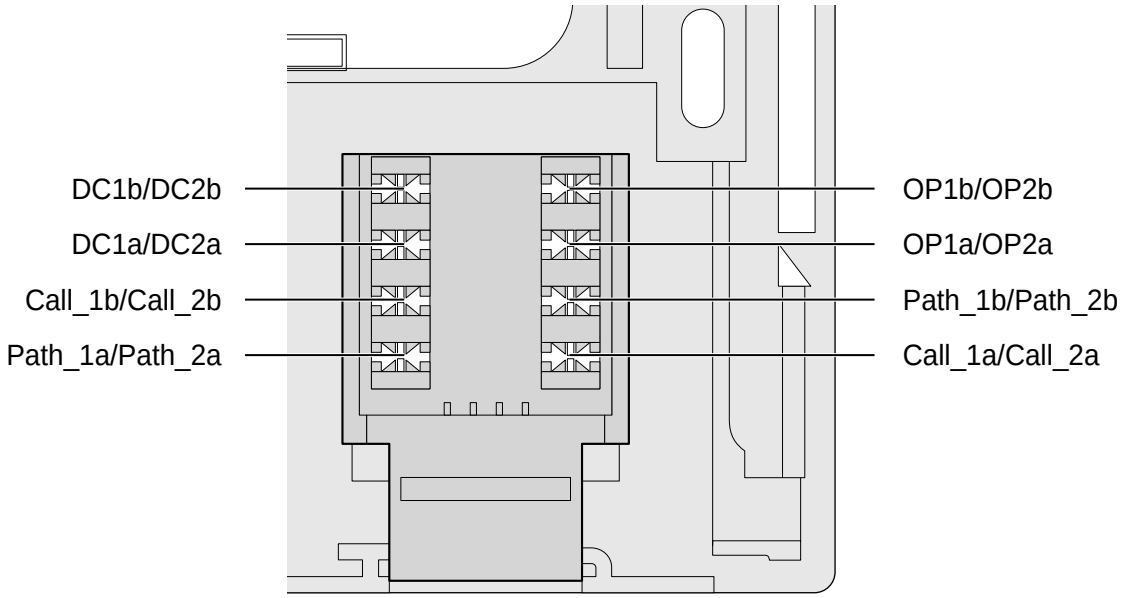
2. Attach the terminal blocks to the connectors of the DPH4 card on the Hybrid IP-PBX.



To door openers

Connection of German Type Doorphones and Door Openers to DPH2 Card

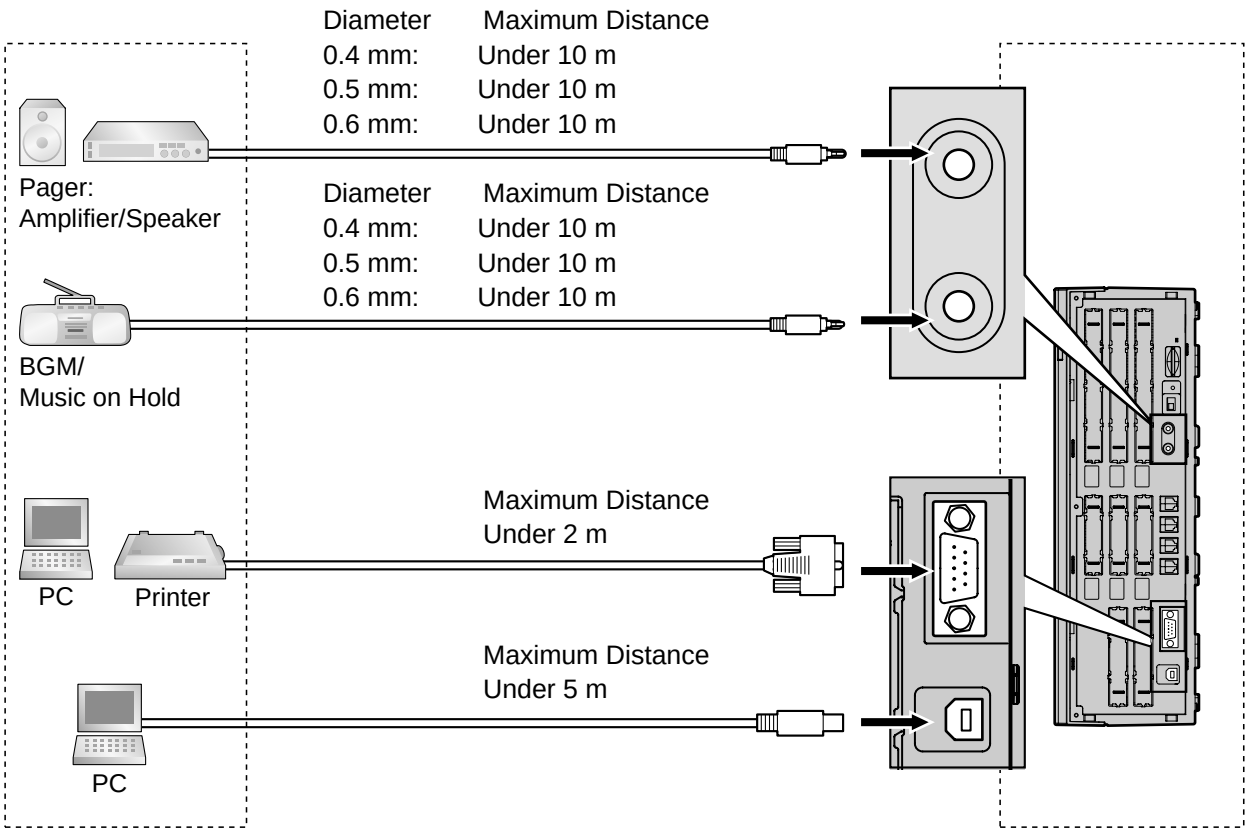
1. Connect DPH2 Card to the terminal box using telephone line cords.
2. Connect the wires of doorphones and door openers to the terminal box as shown below. Refer to "2.5.2 DPH2 Card" for pin assignments.



Terminal Box
(included with the DPH2 Card)

2.10 Connection of Peripherals

2.10.1 Connection of Peripherals



BGM/MOH

The Hybrid IP-PBX provides Background Music and Music on Hold. Only 1 external music source (e.g., user-supplied radios) can be used by connecting them to the Hybrid IP-PBX.

CAUTION

- Wiring should be done carefully to prevent undue force being exerted on the plug. Otherwise, music may intermittent.
- External Music Jack is SELV port and should only be connected to approved SELV devices, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

Note

When the Hybrid IP-PBX and external music sources are not connected to the same earth, hum noise may be induced into Background Music and Music on Hold.

Pager

Only 1 paging devices (user-supplied) can be connected to the Hybrid IP-PBX.

CAUTION

External Paging Jacks are SELV ports and should only be connected to approved SELV devices, or in Australia, via the Line Isolation Unit with the Telecommunications Compliance Label.

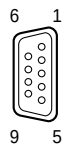
PC/Printer (via RS-232C)

The Hybrid IP-PBX is equipped with an RS-232C interface. This interface provides communication between the Hybrid IP-PBX and the user-supplied devices such as PC or line printers. The RS-232C port is used for system programming, SMDR, diagnostics and external system database storage (save/load) functions.

Note

Use an RS-232C cross cable for connection between the Hybrid IP-PBX and PC.

Pin Assignments



No.	Signal Name	Function	Circuit Type	
			EIA	CCITT
2	RD (RXD)	Received Data	BB	104
3	SD (TXD)	Transmitted Data	BA	103
4	ER (DTR)	Data Terminal Ready	CD	108.2
5	SG	Signal Ground	AB	102
6	DR (DSR)	Data Set Ready	CC	107
7	RS (RTS)	Request To Send	CA	105
8	CS (CTS)	Clear To Send	CB	106

Connection Charts

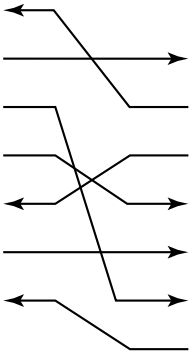
For connecting printer/PC with a 9-pin RS-232C connector

Hybrid IP-PBX				Printer/PC		
Circuit Type (EIA)	Signal Name	Pin No.		Pin No.	Signal Name	Circuit Type (EIA)
BB	RD (RXD)	2	↔	2	RD (RXD)	BB
BA	SD (TXD)	3	↔	3	SD (TXD)	BA
CD	ER (DTR)	4	↔	4	ER (DTR)	CD
AB	SG	5	↔	5	SG	AB
CC	DR (DSR)	6	↔	6	DR (DSR)	CC
CA	RS (RTS)	7	↔	7	RS (RTS)	CA
CB	CS (CTS)	8	↔	8	CS (CTS)	CB

For connecting printer/PC with a 25-pin RS-232C connector

Hybrid IP-PBX

Circuit Type (EIA)	Signal Name	Pin No.
BB	RD (RXD)	2
BA	SD (TXD)	3
CD	ER (DTR)	4
AB	SG	5
CC	DR (DSR)	6
CA	RS (RTS)	7
CB	CS (CTS)	8



Printer/PC

Pin No.	Signal Name	Circuit Type (EIA)
1	FG	AA
3	RD (RXD)	BB
2	SD (TXD)	BA
20	ER (DTR)	CD
7	SG	AB
5	CS (CTS)	CB
6	DR (DSR)	CC
4	RS (RTS)	CF

RS-232C Signals

- **Received Data (RXD):**…(input)
  Conveys signals from the printer or the PC.
- **Transmitted Data (TXD):**…(output)
  Conveys signals from the unit to the printer or the PC. A "Mark" condition is held unless data or BREAK signals are being transmitted.
- **Data Terminal Ready (DTR):**…(output)
  This signal line is turned ON by the unit to indicate that it is ON LINE. Circuit ER (DTR) ON does not indicate that communication has been established with the printer or the PC. It is switched OFF when the unit is OFF LINE.
- **Signal Ground (SG)**
  Connects to the DC ground of the unit for all interface signals.
- **Data Set Ready (DSR):**…(input)
  An ON condition of circuit DR (DSR) indicates the printer or the PC is ready. Circuit DR (DSR) ON does not indicate that communication has been established with the printer or the PC.
- **Request To Send (RTS):**…(output)
  This lead is held ON whenever DR (DSR) is ON.
- **Clear To Send (CTS):**…(input)
  An ON condition of circuit CS (CTS) indicates that the printer or the PC is ready to receive data from the unit. The unit does not attempt to transfer data or receive data when circuit CS (CTS) is OFF.
- **Frame Ground (FG)**
  Connects to the unit frame and the earth ground conductor of the AC power cord.

PC/Server PC (via USB version 1.1)

The Hybrid IP-PBX is equipped with a USB interface. This interface provides communication between the Hybrid IP-PBX and a PC or a Server PC.

The PC is used for system programming, diagnostics and external system database storage (save/load) functions.

The Server PC is used for connecting PCs on a LAN to provide third party call control CTI. The CTI connection uses the CSTA Phase 3 protocol.

Note

The operating system of the PC or Server PC required for third party call control depends on your CTI application software. For details, refer to the manual for your CTI application software.

Pin Assignments

No.	Signal Name
1	VBUS
2	USB D-
3	USB D+
4	GND

2.11 Auxiliary Connection for Power Failure Transfer

2.11.1 Auxiliary Connection for Power Failure Transfer

When the power supply to the Hybrid IP-PBX fails, power failure transfer (PFT) will switch from the current connection to the Auxiliary Connection. Refer to "2.4.1 Power Failure Transfer" in the Feature Guide for further information.
Auxiliary Connection is required to implement this feature.

Note

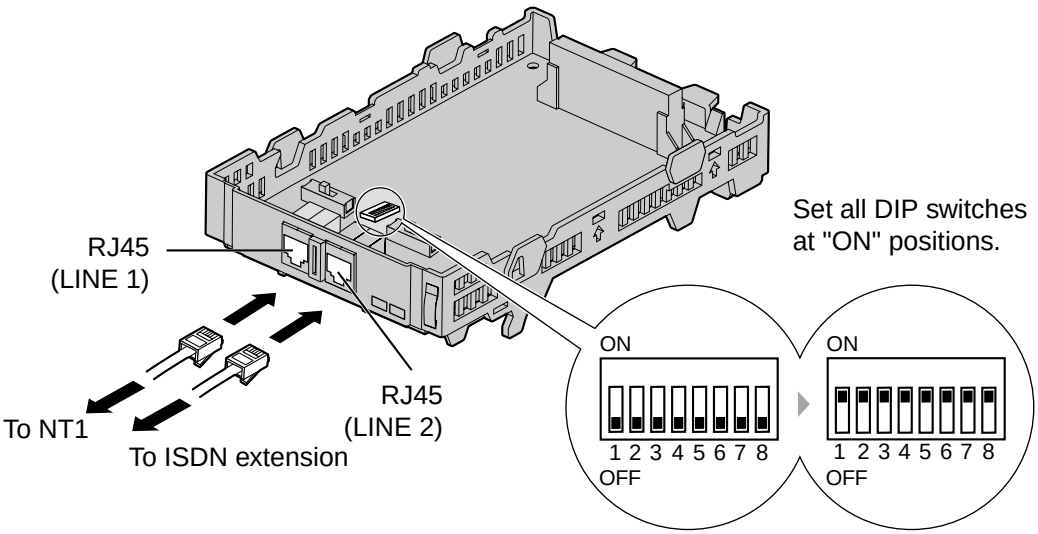
While DC power is provided by the backup batteries, the Hybrid IP-PBX will remain fully operational and the connection will not switch to the Auxiliary Connection.

Using BRI Card

LINE 1 and LINE 2 of the BRI2 card can be used for Auxiliary Connections.

Note

When the power returns, the connection will switch back to normal configuration from the Auxiliary Connection, and a trunk conversation established during power failure will be dropped.



Accessory and User-supplied Items

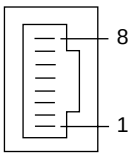
Accessory (included): none

User-supplied (not included): RJ45 connectors

Switch Settings

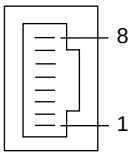
Switch	Type	Usage and Status Definition
PFT Setting	DIP	Set all DIP switches to "ON" positions to use LINE 1 and LINE 2 as a PFT port. LINE 1: Power Failure LINE (NT1) LINE 2: Power Failure EXTN (extension)

RJ45 Connector LINE 1 Pin Assignments



No.	Signal Name	Level [V]	Function
1-2	Reserved	–	–
3	TX1	(+)	Transmit data 1
4	RX2	(+)	Receive data 2
5	RX1	(-)	Receive data 1
6	TX2	(-)	Transmit data 2
7-8	Reserved	–	–

RJ45 Connector LINE 2 Pin Assignments



No.	Signal Name	Level [V]	Function
1-2	Reserved	–	–
3	RX2	(+)	Receive data 2
4	TX1	(+)	Transmit data 1
5	TX2	(-)	Transmit data 2
6	RX1	(-)	Receive data 1
7-8	Reserved	–	–

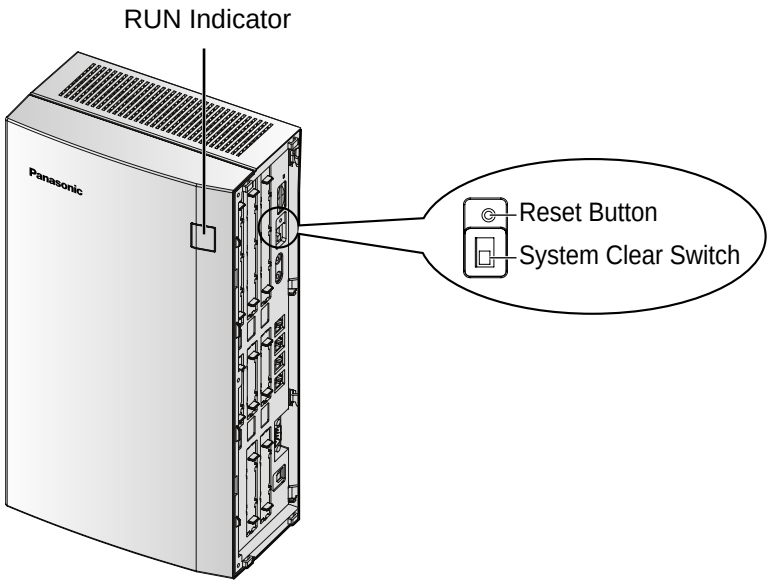
2.12 Starting the Hybrid IP-PBX

2.12.1 Starting the Hybrid IP-PBX

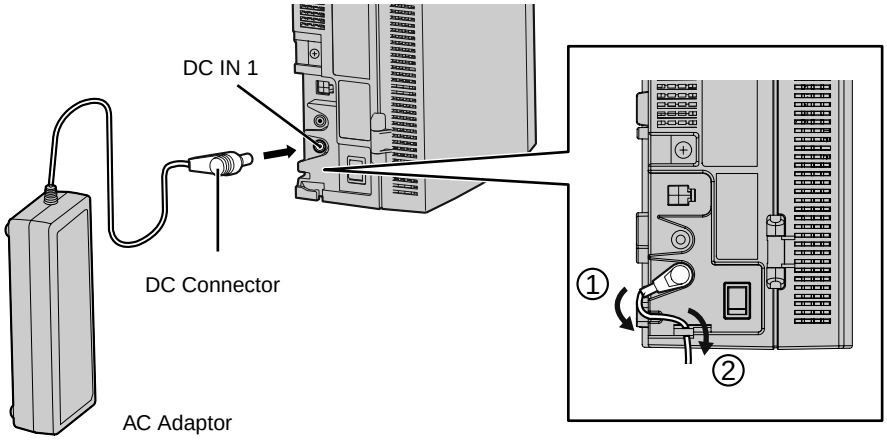
CAUTION

- SD Memory Card must be inserted in the SD Memory Card slot of the main board before start up.
- Before touching the System Clear Switch and the Reset Button, discharge static by touching ground or wearing an earthing strap.
- Once you have started the Hybrid IP-PBX and if you unplug the Hybrid IP-PBX, do not perform the following procedures to start the Hybrid IP-PBX again. Otherwise, your programmed data is cleared. To restart the Hybrid IP-PBX, refer to "4.1.4 Using the Reset Button".
- The Hybrid IP-PBX will continue to be powered even if the power switch is turned "OFF".
- The power supply cord is used as the main disconnect device, ensure that the socket-outlet is located/installed near the equipment and is easily accessible.

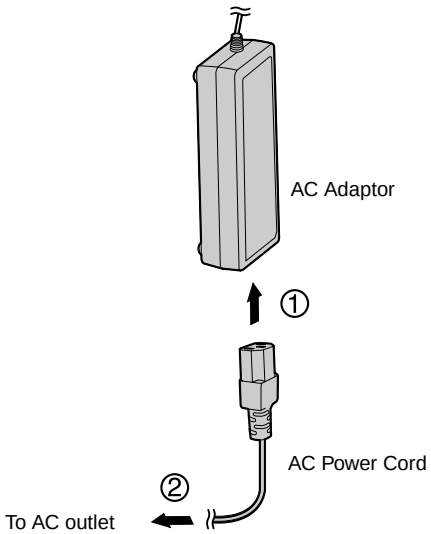
1. Slide the System Clear Switch towards the Reset Button.



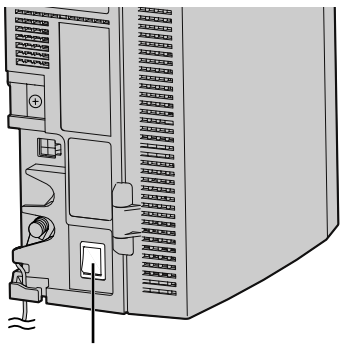
2. Plug the DC connector of the AC adaptor into the DC IN 1.



3. Plug the AC cord into the AC adaptor, and then plug the other end into an AC outlet.



4. Turn on the power switch.



Power Switch

Notes

- For safety reasons, follow the procedures as indicated when turning on the Hybrid IP-PBX.
- For safety reasons, do not stretch, bend, or pinch the AC cord and the DC cable of the AC adaptor.

5. Press the Reset Button with a pointed tool. (The RUN indicator will flash.)
6. While the RUN indicator is flashing (within about 10 s), set the System Clear Switch back to the normal position. Depending on the configuration, initialisation takes about 1 min to 3 min. If successfully executed, the RUN indicator will stop flashing and be kept lit.

All data will be cleared, and the Hybrid IP-PBX as well as all optional service cards (except for the IP-GW4 card) will be initialised to the default values. The DPTs should show the time as 01:00.
The data of the IP-GW4 card will not be initialised.

Notes

- Use the same types of AC adaptor and AC cord that are supplied with the Hybrid IP-PBX only.

LED Indications

Colour	Description
Green	PBX status indication • OFF: Power Off (includes normal reset) • ON: Power On and running (on-line) • Flash (60 times per minute): Power On and starting • Flash (120 times per minute): Power On and resetting before system clear
Red	Alarm detection status indication • OFF: Normal • ON: Alarm (CPU stop, alarm for each card) • Flash: Alarm (MPR file error in restarting)

Confirming the Trunk Connection

After initialisation, programme the Hybrid IP-PBX and establish trunk connection, and then use a PT to confirm it.

To confirm, dial [✳] [3] [7] + trunk number (3 digits) or press S-CO button (CO01 to CO64). You will hear a dial tone if the trunk is available and connected.

Turning off the Hybrid IP-PBX

For safety reasons, make sure to turn off the power switch before unplugging the Hybrid IP-PBX. To unplug, follow the reverse steps to plug it in.

Section 3

Guide for the KX-TDA Maintenance Console

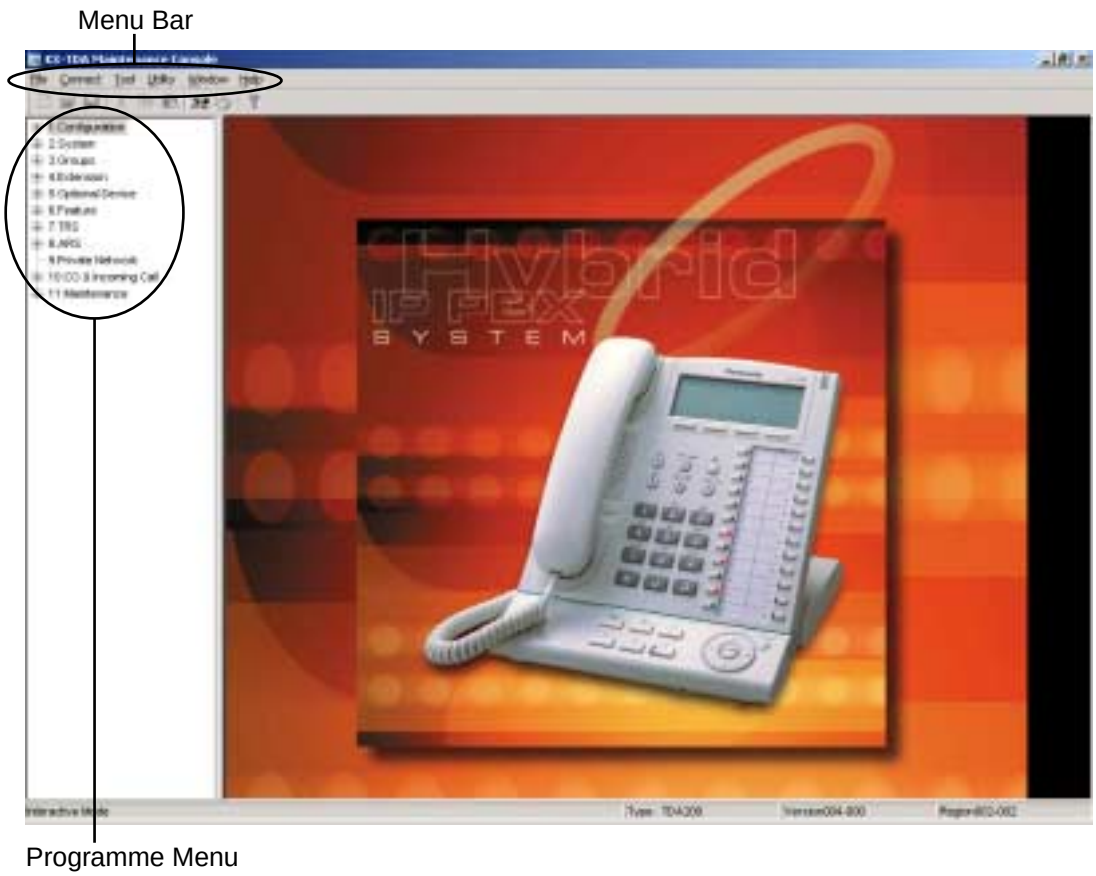
Explains the installation procedure, structure, and basic information of the KX-TDA Maintenance Console.

3.1 Overview

3.1.1 Overview

KX-TDA Maintenance Console is designed to serve as an overall system programming reference for the Hybrid IP-PBX. To programme and administer the Hybrid IP-PBX by PC, you need to install the KX-TDA Maintenance Console onto the PC.
This manual describes overview and installation of the KX-TDA Maintenance Console only.

KX-TDA Maintenance Console[*1]

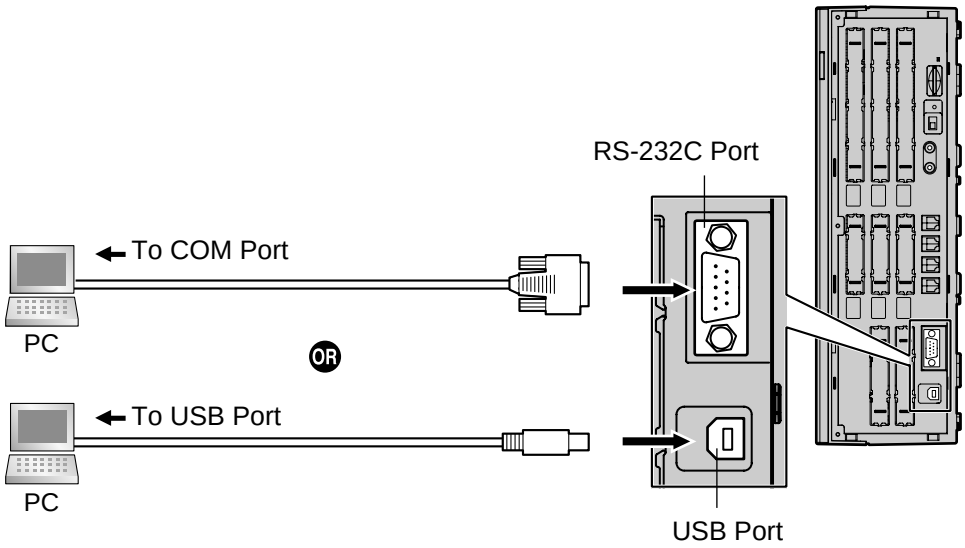


[*1] The contents and design of the software are subject to change without notice.

3.2 Connection

3.2.1 Connection

Serial Interface Connection



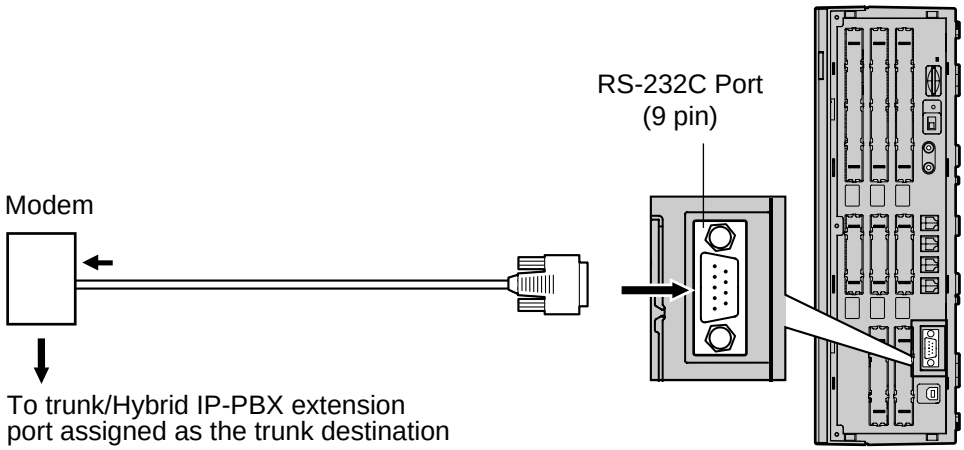
Note

For pin assignments and maximum cabling distance, refer to "2.10.1 Connection of Peripherals".

Modem Connection Using RMT Card

For details about connecting the RMT card, refer to "2.5.6 RMT Card".

External Modem Connection



External Modem			Hybrid IP-PBX	
Signal Name	Pin No.		Pin No.	Signal Name
RD (RXD)	2	←	2	RD (RXD)
SD (TXD)	3	→	3	SD (TXD)
DR (DSR)	6	←	4	ER (DTR)
ER (DTR)	20	→	6	DR (DSR)

After connecting the Hybrid IP-PBX and the external modem, set the power switch of the external modem to "ON", then the external modem will be initialised with the default values.

The following AT command settings may be required for the modem:

- The Data Terminal Ready (DTR) signal should be ignored.
- The Data Terminal Equipment (DTE)/Modem flow control should be turned off.
- The data compression should be disabled.
- Error Correction is not necessary.

Notes

- Use an RS-232C straight cable for connection between the Hybrid IP-PBX and external modem.
- An AT command (for initialisation, enabling automatic answer, etc.) can only be programmed by KX-TDA Maintenance Console. "AT&F0E0V1X1S10=30S12=50" is stored as the default value.
- For more information about the AT command, refer to the external modem's instructions.

3.3 Installation of the KX-TDA Maintenance Console

3.3.1 Installing and Starting the KX-TDA Maintenance Console

System Requirements

Operating System

- Microsoft® Windows® 98 SE, Windows Me, Windows 2000, or Windows XP

Hardware

- CPU: Intel® Pentium® 133 MHz or better microprocessor
- RAM: at least 64 megabytes (MB) of free RAM (128 MB recommended)
- HDD: at least 100 MB of hard disc space and about 2 MB of additional disc space for user files

Password Security

A password is required to perform programming for security purposes. Do not disclose the password. This will avoid unauthorised access and possible dial through fraud.

Warning to the Administrator regarding the system password

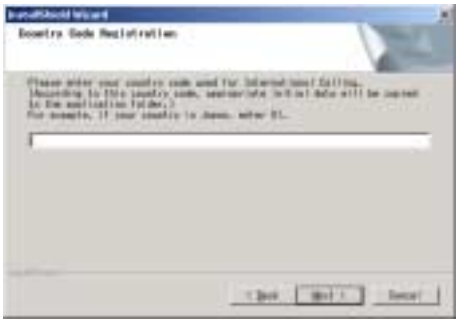
1. Please inform the customer of the importance of the password and the possible dangers.
2. Please maintain the secrecy of the password. This will avoid unauthorised access and possible dial through fraud.
3. Please change the password periodically.
4. We strongly recommend that a password of 10 digits is used for maximum protection against hackers.
5. If the system password is forgotten, you can examine the backup of the system programming.

- If you have a backup system data, you can find the password by loading the backup system data onto the PC and check the password using the programming tool. As for a backup system data, refer to "3.3.4 Hybrid IP-PBX Maintenance".
- If you do not have a backup system data, you have to set the PBX to the factory default and reprogramme it. Therefore, we recommend to save a backup system data.

Installing the KX-TDA Maintenance Console and Selecting Appropriate Country/Area Data

To install or uninstall the software into Windows 2000 Professional or Windows XP Professional, the user must be grouped either of "Administrators" or "Power Users".

1. **a.** Save the setup file of the KX-TDA Maintenance Console on your PC.
   b. Double-click the icon to execute the setup file.
   c. Follow the instructions of the wizard.



2. **a.** Type the appropriate **Country Code**. The KX-TDA Maintenance Console will be installed with the appropriate default data for specific country/area.
   b. Click [Next].
   c. Follow the instructions of the wizard.
   d. Click [Finish].
   e. Click [OK].

Starting the KX-TDA Maintenance Console and Assigning the Basic Items (Quick Setup)

When you start the KX-TDA Maintenance Console with the Installer Level Programmer Code and connect to the Hybrid IP-PBX for the first time after initialisation (with the factory default setting), Quick Setup will launch automatically. During Quick Setup, you will setup the following basic items:

- Date and Time of the Hybrid IP-PBX. The date and time set on the PC will be used.
- System Password for installer for PC programming.
- Operator extension numbers. Operator extensions for all time modes (day/lunch/break/night) can be assigned.
- Flexible Numbering type to pattern 1 or pattern 2. If pattern 1 (with ✳) is selected, "✳" must prefix all feature numbers (except access numbers) when an extension user wants to use a feature.
- Operator call and Idle Line Access/ARS numbers (0 or 9). The feature numbers for operator call and Idle Line Access/ARS can be selected.
- Remote Maintenance Dial Number. Enter the complete telephone number of the PBX (including the country code). When necessary, this number will be used to access the PBX from a remote location for maintenance purposes.

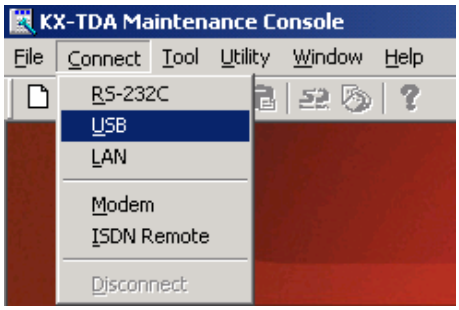
1. Click "**Start**" → "**Programs**" → "**KX-TDA Maintenance Console**" → "**KX-TDA Maintenance Console**".

2. Type the Installer Level Programmer Code (default: **1234**), then click [OK].

   The Programmer Code authorises different programming levels, and the Quick Setup is only available when you start the KX-TDA Maintenance Console with Installer Level Programmer Code.

   Note

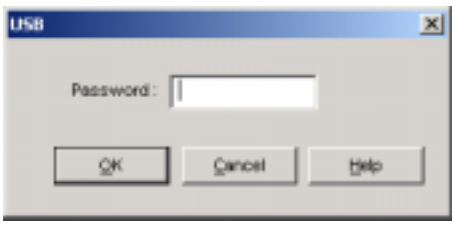
   There are 2 other Programmer Codes with limited authorisation: Administrator Level (default: **1111**), and User Level (default: none).



3. Click "**Connect**" → "**USB**" from the menu bar.

   Note

   To connect with USB, you need to have installed the KX-TDA USB driver. Follow the instructions of the wizard to install the KX-TDA USB driver.



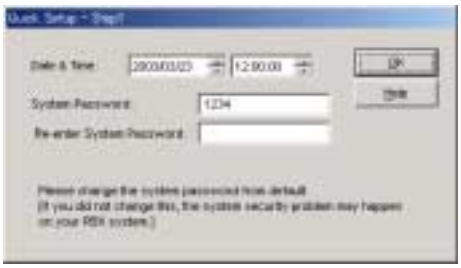
4. Type the system password for installer (default: **1234**), then click [OK] to log-in.

5. **When country/area data do not match:**

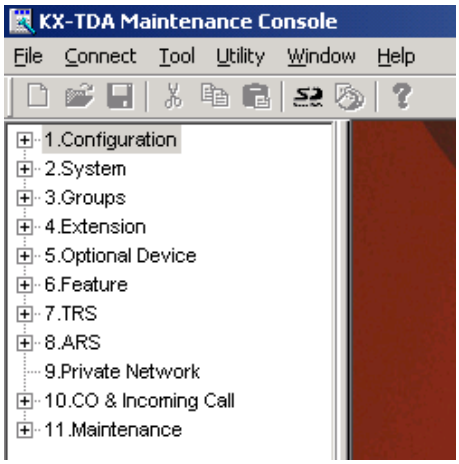
   a. Click [OK] to replace the country/area data of the Hybrid IP-PBX. Replacement may take several minutes to complete.

   b. Follow the procedure described in "2.12.1 Starting the Hybrid IP-PBX" and restart the Hybrid IP-PBX.

   c. Repeat steps **1** to **3** to restart the KX-TDA Maintenance Console.



6. Follow the instructions of the wizard and assign the basic items (Quick Setup).



The programme menu appears.

Notice

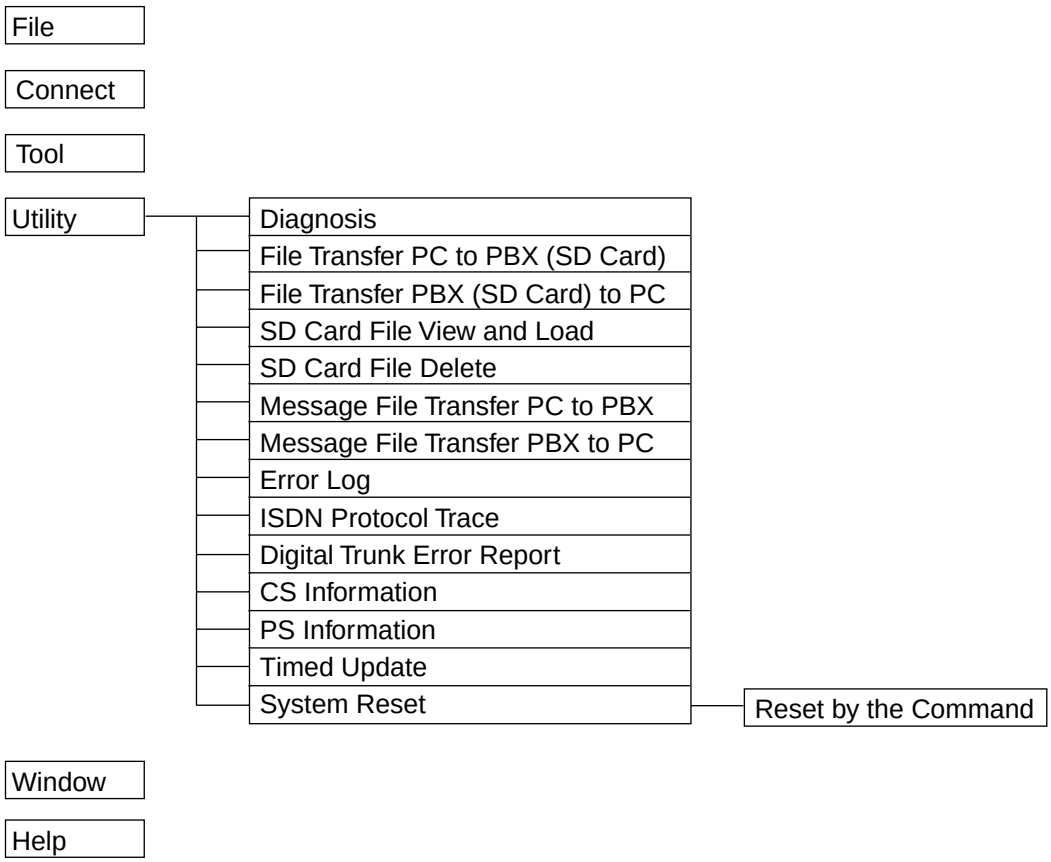
1. During a long programming session, it is highly recommended that you periodically save the system data to the SD Memory Card. You can think of system data as stored in RAM, whereas SD Memory Card as stored on a hard disk. If the PBX undergoes a sudden power failure or system reset for some reason, all the system data will be lost. To save the system data to the SD Memory Card, (1) click "**SD Memory Backup**" icon before resetting the PBX or turning off the power, or (2) exit the KX-TDA Maintenance Console so that the PBX starts automatically to save the system data.
2. When the PBX is initialised, not all data is taken from the SD Memory Card. The data for present status of extension FWD/DND button is taken from battery backup memory in the PBX.

CAUTION

Do not remove the SD Memory Card during access to it. Doing so will damage the system data, and in the worst case, damage the SD Memory Card.

3.3.2 Structure of the KX-TDA Maintenance Console

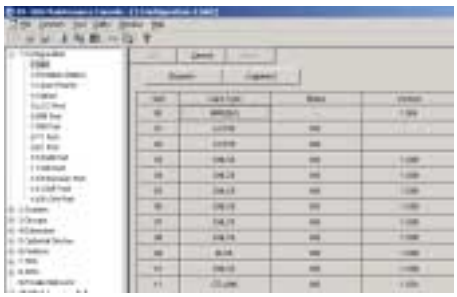
Menu Bar



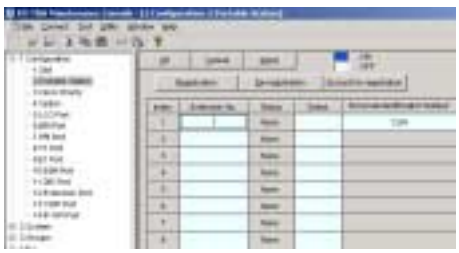
3.3.3 Hybrid IP-PBX Configuration

This section briefly describes how to check the configuration of the Hybrid IP-PBX using the KX-TDA Maintenance Console when PC and the Hybrid IP-PBX are connected by USB cable. For detailed descriptions of each feature and related PT programming, refer to the on-line help at each screen.

1. Start the KX-TDA Maintenance Console (refer to "Starting the KX-TDA Maintenance Console and Assigning the Basic Items (Quick Setup)" in "3.3.1 Installing and Starting the KX-TDA Maintenance Console").



2. To check the slot condition of the Hybrid IP-PBX:
   a. Double-click "**Configuration**".
   b. Double-click "**Slot**".



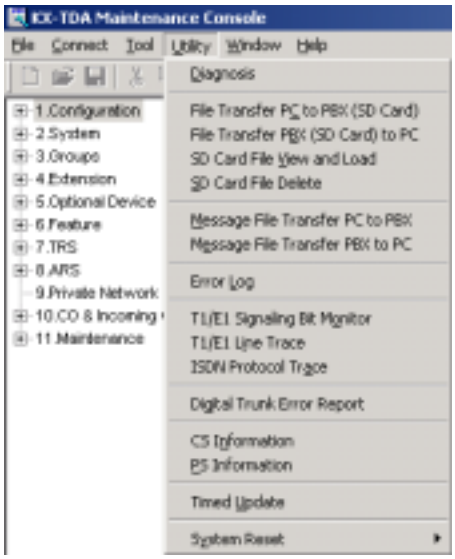
3. To check the PS status:
   a. Double-click "**Configuration**".
   b. Double-click "**Portable Station**".

4. To check other configurations, double-click the other items in the same manner.

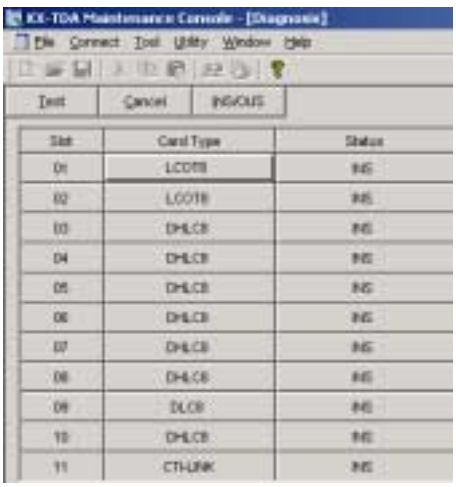
3.3.4 Hybrid IP-PBX Maintenance

This section briefly describes how to perform maintenance of the Hybrid IP-PBX using the KX-TDA Maintenance Console when PC and the Hybrid IP-PBX are connected by USB cable. For detailed descriptions of each feature and related PT programming, refer to the on-line help at each screen.

1. Start the KX-TDA Maintenance Console (refer to "Starting the KX-TDA Maintenance Console and Assigning the Basic Items (Quick Setup)" in "3.3.1 Installing and Starting the KX-TDA Maintenance Console").



2. To diagnose a card:
Click "**Utility**" → "**Diagnosis**" from the menu bar.



3. **a.** Click "**Status**" of the desired card and change its status to "**OUS**".
   b. Click "**Card Type**" of the desired card. The diagnosis screen appears.

To use other utility commands, click the desired item in the step 2 above.

File Transfer PC to PBX (SD Card)	The programme files in the PC are transferred to SD Memory Card of the Hybrid IP-PBX. Programme files in the SD Memory Card is overwritten in this process.
File Transfer PBX (SD Card) to PC	The programme files in the SD Memory Card are transferred to the PC.
SD Card File View and Load	The name, date, time, and size of programme files in the SD Memory Card are viewed, then these files are transferred to each optional service card in the Hybrid IP-PBX.
SD Card File Delete	The programme files in the SD Memory Card are deleted.
Message File Transfer PC to PBX	The message files for Outgoing Messages in the PC are transferred to all MSG cards mounted on the OPB3 card of the Hybrid IP-PBX. Available only when at least 1 MSG card is installed.
Message File Transfer PBX to PC	The message files for Outgoing Messages in the MSG cards mounted on the OPB3 card are transferred to the PC. Available only when at least 1 MSG card is installed.
Error Log	The error log is displayed (for details, refer to "4.1.5 Troubleshooting by Error Log").
ISDN Protocol Trace	Displays ISDN protocol trace data of the BRI/PRI card.
Digital Trunk Error Report	Displays the errors on digital trunks that are collected in the past for selected time units (10 min, 30 min, 1 h, or 24 h).
CS Information	Displays the internal information of the CS.
PS Information	Displays the registration information of the PS.
Timed Update	Updates the programmes in the LPR cards (optional service cards with local processors) when newer programmes are found in the SD Memory Card by comparing them at a preset time. (During the update, the cards become out of service.)
System Reset → Reset by the Command	Resets the connected Hybrid IP-PBX. (It is the same as pushing the Reset Button with the System Clear Switch in the normal position.) After using this command, you have to restart the KX-TDA Maintenance Console and connect to the Hybrid IP-PBX again.

Section 4
Troubleshooting

This section provides information on the Hybrid IP-PBX and telephone troubleshooting.

4.1 Troubleshooting

4.1.1 Installation

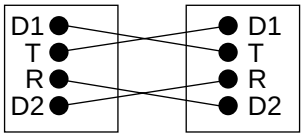
PROBLEM	PROBABLE CAUSE	SOLUTION
Extension does not operate.	Bad extension card.	Exchange the card for a known working one.
	Bad connection between the Hybrid IP-PBX and telephone.	Take the telephone and plug it into the same extension port using a short telephone cord. If the telephone works, then the connection between the Hybrid IP-PBX and the telephone must be repaired.
	A telephone with an A-A1 relay is connected.	Use a 2-wire cord. Set the A-A1 relay switch of the telephone to the "OUT" or "OFF" position.
	Bad telephone.	Take the telephone and plug it into another extension port that is working. If the telephone does not work, replace the telephone.
	The number of terminal equipment exceeds the capacity of the Hybrid IP-PBX with the supplied AC adaptor only.	Connect an additional AC adaptor.
Improper operation.		Press the Reset Button (refer to "4.1.4 Using the Reset Button").
Noise on external paging.	Induced noise on the wire between the Hybrid IP-PBX and the amplifier.	Use a shielded cable as the connection wire between the Hybrid IP-PBX and amplifier. A short shielded cable is recommended.
Distorted external music.	Excessive input level from external music source.	Decrease the output level of the external music source by using the volume control on the music source.
Alternate Calling—Ring/Voice and Live Call Screening (LCS) do not function as set when using a Wireless Phone (KX-T7880/KX-T7885/KX-TD7894/KX-TD7895).	Voice-calling mode and Hands-free mode with LCS are not available with Wireless Phones.	Switch the calling mode to ring-calling. Set the LCS mode to "Private".
The ALARM indicator on the front of the cabinet turns on red.	A major system error occurs in the Hybrid IP-PBX.	See the error log using the KX-TDA Maintenance Console (refer to "4.1.5 Troubleshooting by Error Log").

4.1.2 Connection

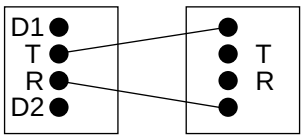
Can you dial an extension?

No

Connection between the Hybrid IP-PBX and a PT:

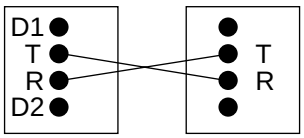
CAUSE	SOLUTION
The T/R is connected to the D1/D2.  	Use the correct cord (the inner 2 wires are for T/R and the outer 2 wires are for D1/D2).

Connection between the Hybrid IP-PBX and an SLT:

CAUSE	SOLUTION
The T/R is connected to the D1/D2.  	Use the correct cord (the inner 2 wires are for T/R). • If a telephone equipped with an A-A1 relay is connected to the Hybrid IP-PBX, set the A-A1 relay switch of the telephone to "OFF".

Yes

Connection between the Hybrid IP-PBX and an SLT that is polarity-sensitive:

CAUSE	SOLUTION
The "T" is connected to the "R".  	Reverse the connections of the T/R.

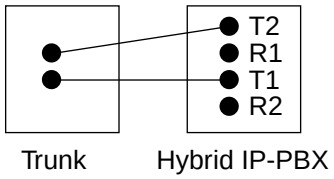
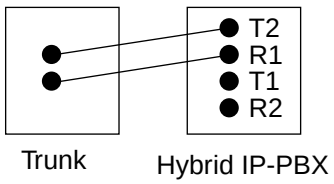
(Continued on the following page.)

(Continued from the previous page.)

Can you dial out on a trunk?

No

Connection between the trunk and the Hybrid IP-PBX:

CAUSE	SOLUTION
Trunk is connected to the T2/T1.  Trunk is connected to the T2/R1.  	Reconnect the trunk to the T1/R1 or T2/R2 of the telephone jack using 2-conductor wiring.

4.1.3 Operation

PROBLEM	PROBABLE CAUSE	SOLUTION
• When using the speakerphone on an APT, nothing is audible. • When using the speakerphone/monitor mode with a DPT, nothing is audible.	• The HANDSET/ HEADSET selector is set to the "HEADSET" position. • The "HEADSET" mode is selected by Personal Programming, "Handset/Headset Selection".	• When the headset is not used, set the HANDSET/HEADSET selector to the "HANDSET" position. • When the headset is not used, select the "HANDSET" mode by Personal Programming.
• The PT does not ring.	• The ringer volume is off.	• Turn on the ringer volume.
• During a power failure, extensions connected to ports 1 and 2 of hybrid extension ports do not operate.	• A DPT or APT is connected to the extension port. • The dialling mode (tone or pulse) is incorrect.	• Disconnect the DPT or APT and connect an SLT. • Set the Tone/Pulse switch to the other position.
• Originating an outside call, call transfer, or conference cannot be performed.	• The corresponding CO button does not exist on the PT.	• Programme the CO button. Refer to "1.18.2 Flexible Buttons" in the Feature Guide.

PROBLEM	PROBABLE CAUSE	SOLUTION
• Cannot register the PS.	• Wrong Personal Identification Number (PIN) is registered to the PS.	• Register the PIN set to the Hybrid IP-PBX into the PS.
	• CS is not connected properly.	• Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off.
• PS becomes out of range. • Cannot make calls using the PS.	• CS is not working.	• Make sure that the cable is connected properly with correct pin assignments. Also, make sure that the cable does not make short circuits. • Switch all DIP switches off.
	• Location of CS is not good.	• Locate the CS properly (refer to "2.7.5 Site Survey Using the KX-TD7590" or "2.8.5 Site Survey").
	• Access system of the PS is not properly set.	• Change the access system setting of the PS to the appropriate system or automatic.
• Noise is frequent while using the PS. • Conversations disconnect while using the PS.	• Call handover is not working. • PS is out of CS coverage area.	• Locate the CS properly (refer to "2.7.5 Site Survey Using the KX-TD7590" or "2.8.5 Site Survey").
• PS stays out of service when the CS status is changed from Out of Service to In Service.	• It may take about 20 s for CS to start up after the status has been changed to In Service.	• Wait until the CS starts up.

4.1.4 Using the Reset Button

If the Hybrid IP-PBX does not operate properly, use the Reset Button. Before using the Reset Button, try the system feature again to confirm whether there definitely is a problem or not.

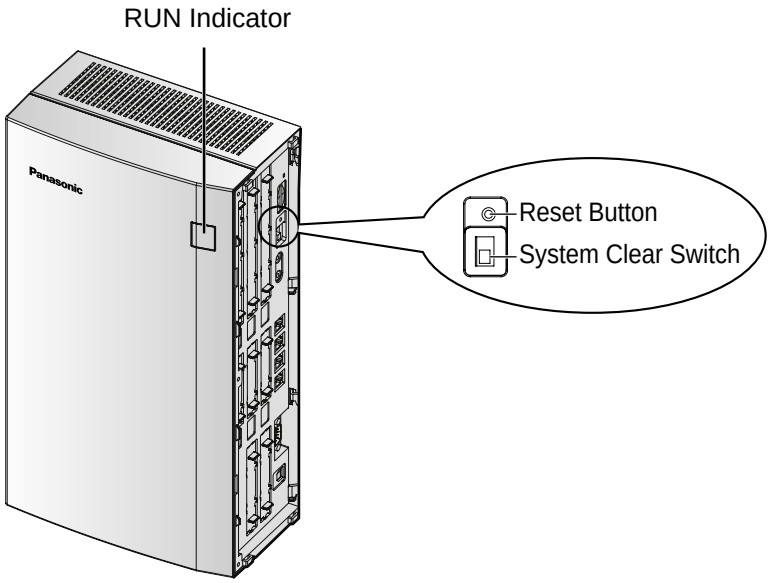
Notes

1. When the System Clear Switch is set to the normal position, pressing the Reset Button causes the following:
   - Camp-on is cleared.
   - Calls on hold are terminated.
   - Calls on exclusive hold are terminated.
   - Calls in progress are terminated.
   - Call park is cleared.

   Other data stored in memory, except the above, are not cleared.
2. After sliding the System Clear Switch towards the Reset Button, you must press the Reset Button with caution, because all data stored in memory will be cleared by the following operation: (1) pressing the Reset Button and then, (2) setting the System Clear Switch back to the normal position while the RUN indicator is flashing (within approximately 10 s).

Operation

1. If the Hybrid IP-PBX does not operate properly:
   a. Make sure that the System Clear Switch is set to the normal position.
   b. Press the Reset Button.



2. If the Hybrid IP-PBX still does not operate properly:
   a. Slide the System Clear Switch towards the Reset Button.
   b. Press the Reset Button.
   c. Set the System Clear Switch back to the normal position while the RUN indicator is flashing (within approximately 10 s).

Note

As a result of Step 2, all the programmed data will be cleared.

3. If the Hybrid IP-PBX still does not work:

a. Unplug the Hybrid IP-PBX.

b. Slide the System Clear Switch towards the Reset Button.

c. Plug in the Hybrid IP-PBX after 5 min.

d. Press the Reset Button.

e. Set the System Clear Switch back to the normal position while the RUN indicator is flashing (within approximately 10 s).

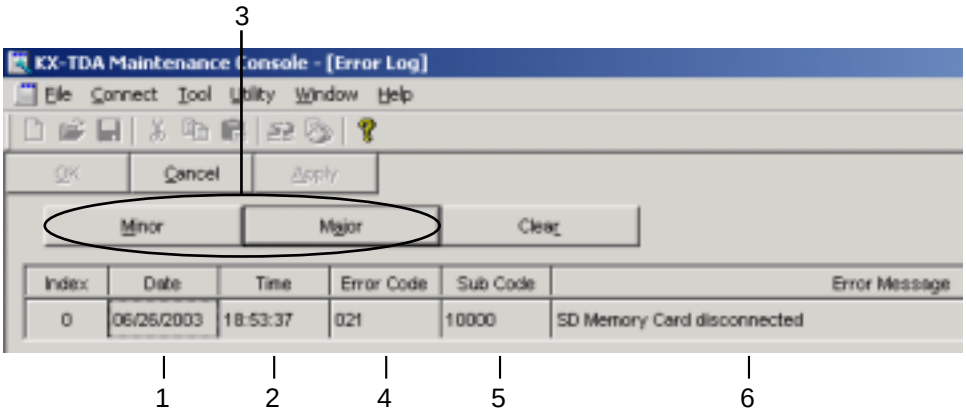
4.1.5 Troubleshooting by Error Log

When a major system error occurs in the Hybrid IP-PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

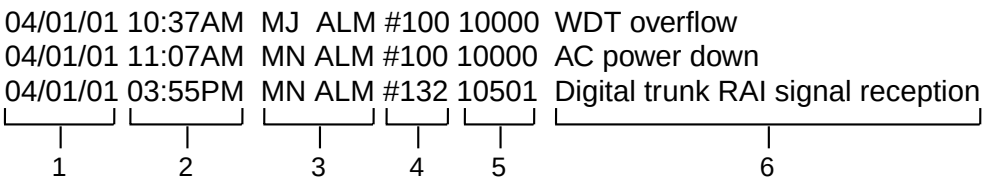
Error Log Display Format

Below is the display format of the error log. To see the error log using the KX-TDA Maintenance Console, refer to "3.3.4 Hybrid IP-PBX Maintenance".

Example: KX-TDA Maintenance Console



Example: Station Message Detail Recording (SMDR)



Description

	Item	Description
1	Date	Date of the error detection
2	Time	Time of the error detection
3	Level	Major Alarm (MJ ALM): Errors that affect the whole system operation, or result in system failure Minor Alarm (MN ALM): Errors that affect certain part of system operation
4	Error Code	Three-digit error code

	Item	Description
5	Sub Code	Five-digit sub code (1XXYY) 1: Cabinet number XX: Slot number (00 to 11) 00: MPR 01: Main Board 02 to 04: Specified Slot 05 to 07: Semi Free Slot 08 to 11: Option Slot YY: Physical port number (01 to 16) For optional cards that are installed in Option Slot, sub slot number + port number will be displayed. Sub slot 1: 11 to 14 **Note** When there is no parameter for slot and physical port number, XX and YY will be displayed as "00". Example: Sub code for MPR = 10000
6	Error Message	Error description (maximum 36 characters)

List of Errors and Solutions

The tables below list the errors and their solutions.

When an error whose error code is indicated with "*" occurs in the Hybrid IP-PBX, the ALARM indicator on the front of the cabinet turns on red, and the system logs the error information.

When the error conditions indicated by the error codes "021", "091", "230", and "510" are recovered, the ALARM indicator will turn off automatically, indicating successful troubleshooting. When other errors are logged, the ALARM indicator will turn off only when the log for major or minor errors is cleared from the KX-TDA Maintenance Console.

In other words, the ALARM indicator will turn off under the following conditions:

- **When the errors "021", "091", "230", and "510" are logged:** when the error conditions are recovered
- **When other errors are logged:** when the log for major or minor errors is cleared from the KX-TDA Maintenance Console

LPR (Optional Service Card with Local Processor) Initial Self Diagnosis

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
211	Speech path loop-back check error	• Optional service card malfunction: DLC, SLC, LCOT, BRI, IP-GW	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Replace the corresponding optional service card
212	Echo canceller access error	• Optional service card malfunction: ECHO	
215	Framer IC access error	• Optional service card malfunction: BRI	
216	MSG card DSP error	• Optional service card malfunction: MSG	
217	MSG card data error	• Optional service card malfunction: MSG • Erroneous recording of messages	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Reset Button • Re-record the messages • Replace the corresponding optional service card

System Start-up and On-line Operation

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
000*	MPR WDT overflow	• Main Board (MPR) malfunction • Erroneous processing of Main Board (MPR) software • Software error due to external factors	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
001	SDRAM bit error		
002	System Restart	• Reset Button is pressed • Power failure • Main Board malfunction • Erroneous processing of Main Board software • Software error due to external factors	• Ignore if not frequent • Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
011*	DC power down	• AC power down • Power supply circuit (Main Board) malfunction • Detection of over current (short circuit on optional service cards)	• Check the power supply system • See if the AC cord is connected properly • Check the AC cord • Replace the AC cord (be sure to turn off the Hybrid IP-PBX when replacing) • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing) • Remove the optional service cards and restart the Hybrid IP-PBX
012*	MPR RAM battery low	• Battery out • Main Board (MPR) malfunction	• Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
016	CS overload	• Defective cable • CS malfunction	• Check the cable diameter and length • Replace the CS
017	BRI port overload	• Defective cable • Defective ISDN terminal equipment • Optional service card malfunction: BRI	• Check the cable • Replace the defective terminal equipment • Check the number of connected terminal equipment • Replace the corresponding optional service card

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
020*	SD file access error	• SD Memory Card malfunction • Bad connection of SD Memory Card • Main Board malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
021*	SD Memory Card disconnected	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	
022*	Not enough free space on SD card	• Not enough memory space available to save the system data, or to upload system files from the KX-TDA Maintenance Console	• Delete the files whose file names start with "$" from SD Memory Card **Note** Do not delete the "PMPR" file; it is the programme file of the Main Board (MPR).
023*	System data file version error	• Old system files on SD Memory Card • Defective system files on SD Memory Card	• Restore the backup files • Re-install the software
024*	System initialization file version error		
025*	Card initialization file version error		
026*	LCD file version error		
027*	System data file checksum error		
028*	System initialization file checksum error		
029*	Card initialization file checksum error		
030*	LCD file checksum error		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
031*	System data file not found	• SD Memory Card not installed • Bad connection of SD Memory Card • SD Memory Card malfunction • Main Board malfunction	• Press the Reset Button • Reprogramme the Hybrid IP-PBX • Replace the SD Memory Card • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
032*	System initialization file not found		
033*	Card initialization file not found		
034*	LCD file not found		
035*	System data file access error		
036*	System initialization file access error		
037*	Card initialization file access error		
038*	LCD file access error		
090	Over Card Limitation	• Too many optional service cards installed	• Reduce the number of optional service cards
091*	PT connection over	• Too many PTs connected	• Reduce the number of PTs
200	LPR start up error (ROM NG)	• Optional service card malfunction: DLC, BRI, IP-GW	• Pull out and re-insert the corresponding optional service card • Press the Rest Button • Replace the corresponding optional service card
201*	LPR start up error (RAM NG)		
202*	LPR start up error (No Program)	• Optional service card malfunction: DLC, BRI, IP-GW	• Pull out and re-insert the corresponding optional service card • Press the Rest Button • Update the software of the corresponding optional service card • Replace the corresponding optional service card
203*	LPR start up error (Version NG)		
204*	LPR start up error (Download NG)		
205*	LPR start up error (No response)		
206	LPR start up error (Card type NG)		
207	LPR start up error (Check SUM NG)		

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
230*	Card disconnected	• Optional service card not installed properly • Optional service card malfunction • Main Board malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Rest Button • Replace the corresponding optional service card • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
231	LPR alive check error	• Optional service card malfunction: DLC, BRI, IP-GW • Main Board (MPR) malfunction	• See if the corresponding optional service card is installed properly • Pull out and re-insert the corresponding optional service card • Press the Rest Button • Replace the corresponding optional service card • Replace the Main Board (be sure to turn off the Hybrid IP-PBX when replacing)
232	MPR-LPR communication error		
233	LPR data check error		
234	DPLL clock failure		
251	MSG DSP failure	• Optional service card malfunction: MSG	• See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
300*	Digital trunk out of synchronization	• Network (digital trunk) malfunction	• Check the signals from the network • Check the cable
301*	Digital trunk RAI reception		
302*	Digital trunk AIS reception		
303*	Multiframe out of synchronization		
304*	Frame error		
305*	Data Link failure	• Data link between the CS and DLC card/ hybrid extension port failed • Data link between the network and BRI card failed	• Check the connection between the CS and DLC card/hybrid extension port • Check the connection between the network and BRI card
307	LAN No Carrier	• IP-GW card not connected to the LAN	• Check the connection between the LAN and IP-GW card

Error Code	Error Message	PROBABLE CAUSE	SOLUTION
310*	Port Link Failure	• Voice Mail malfunction • Ports defective on optional service card: DLC	• Check the Voice Mail • See if the corresponding optional service card is installed properly • Replace the corresponding optional service card
390	Digital signal synchronization established	• Synchronisation of digital line established or restored	• This information is logged when synchronisation of digital line is established, and does not indicate an error condition that needs to be solved
391	Data Link established	• Connection with PC Phone/PC Console or Voice Mail (DPT Integration) established or restored	• This information is logged when connection with PC Phone/PC Console or Voice Mail (DPT Integration) is established, and does not indicate an error condition that needs to be solved. However, if this is logged frequently (with "305 Data Link failure"), check the connection as it may not be done properly.
392	Clock master card selected	• Clock master card has been changed to the one indicated by the sub code	• Check if the proper card is selected as the new clock master card
393	LAN Carrier detected	• IP-GW card connected to the LAN	• This information is logged when synchronisation of LAN is established
510*	SMDR disconnect	• RS-232C cable not connected • Breaking of RS-232C cable • Printer (terminal equipment) malfunction	• Check the RS-232C cable • Check the terminal equipment

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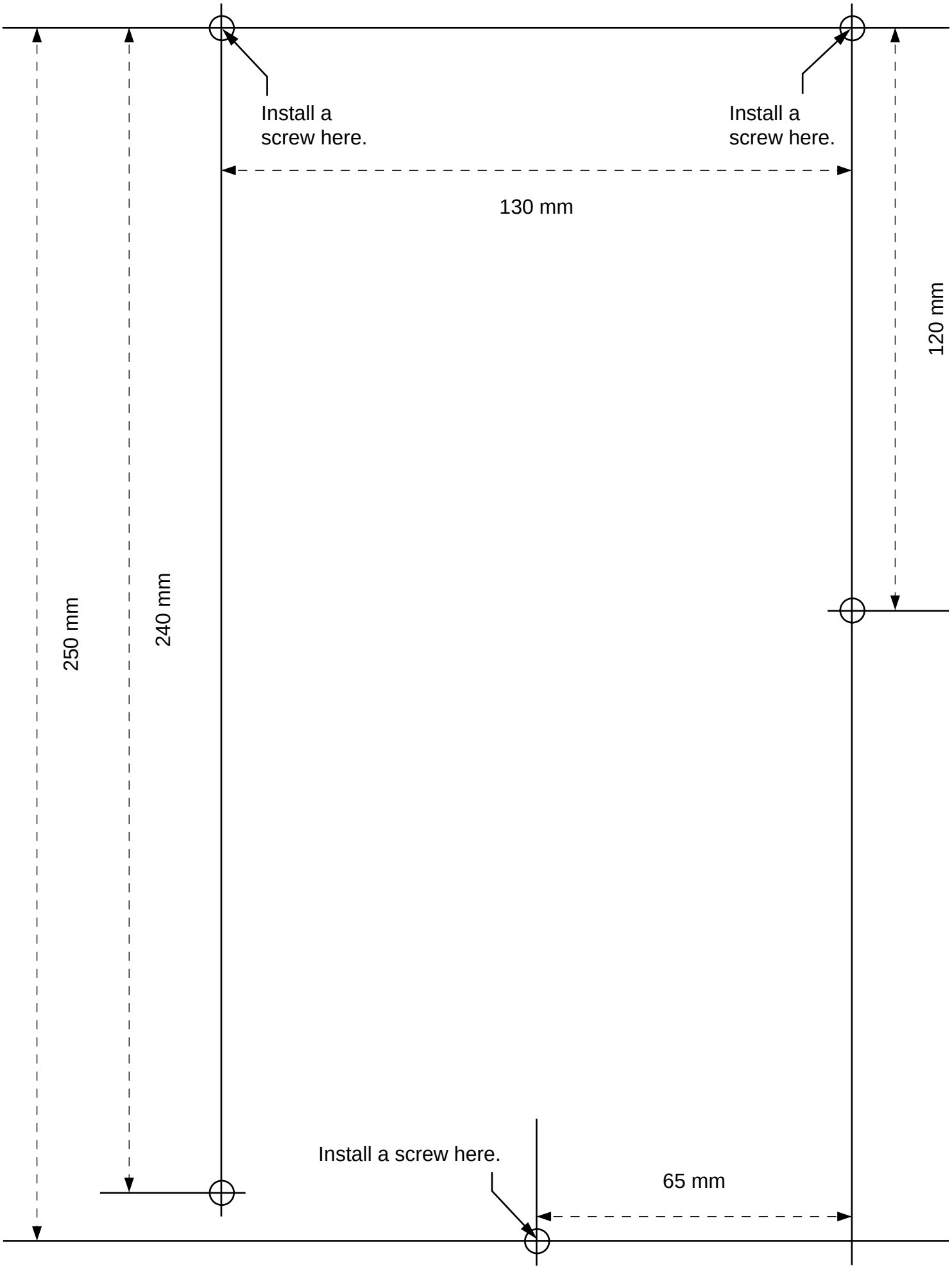

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